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HERNIA:

—ITS—

PALLIATIVE AND RADICAL TREATMENT

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Adults, Children and Infants.

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DEDICATION.

AS a tribute of respectful admiration to one, to whom, for his many sterling traits, his unique genius, his tireless energy, and his disinterested, but deep concern in my progress and advancement; both as his student, and as a practitioner; besides, in grateful remembrance, for the many and inestimable favors, which he has generously bestowed on me, during my life, I respectfully dedicate this monograph; to my preceptor, Dr. Francis Charles Plunkett, of Lowell, Mass.

NEW YORK, January 1st, 1893.

PREFACE.

AS there has been a most noted revival in the study and treatment of hernia, particularly within the past twenty years, it is important for the rank and file, as well as the most noted teachers of the surgical art, to have a clear comprehension of the position which the question occupies at the present time.

My own reading and observations incline me to believe that there is a very wide-spread misconception with regard to what a hernia really is; its precise origin, and its morbid anatomy.

Thousands of operations have recently been, and are being, performed for its radical cure; some operators claiming that intelligent surgical intervention will cure all, while on the contrary there are not a few, equally eminent, who deny that sanguineous methods ever effect a permanent cure. In this chaotic state it is but rational that we inquire just what surgery can do to relieve the infirmity, without danger to the patient's life.

It is only too evident to any observer who has made a study of the subject, that too much instrumentation—the indiscriminate application of the truss in infants—is productive of as much or more harm than too much operating in the adult.

The present aim of the writer is to endeavor to give to each therapeutic resource its due merit, and strive to indicate the precise limitation of each. Necessarily, tautology will be unavoidable, as there is no word in our language which wholly defines the condition for which the word hernia is commonly employed.

NEW YORK, June 27th, 1892.



PART I.

CHAPTER I.

GENERAL CONSIDERATION.

In these times of lightning progress, when steam, electricity and the printing press have brought the whole civilized world into an intimate communion of thought; when news, information and knowledge, are flashed across a continent with as great ease and promptness as from one city to another in the same county or State, the whole world is becoming rapidly cosmopolitan in customs, manners and thought; and hence this diffusion of lay and professional knowledge has rendered it easy for every one, to keep in touch with the greatest revelations of science, and to be constantly correctly informed of the best and latest achievements of those who occupy advanced positions in the various scientific and professional pursuits. So that now the garnering of material, of such a character as will bring a treatise up to our own times, becomes altogether a much easier task than was the case in the near past,

when complete medical libraries were scarce and scattered, and current general medical news was scarce and difficult to obtain. Naturally, with a greater number, in proportion to our population, of medical men in the field, and the increased facilities for compilation and writing, this has become an age of book-making. Notwithstanding this plethoric state of the book-market, there never yet was a time when an opportunity for reward, for honest substantial work, was greater than in ours.

Until the period when the antiseptic treatment of wounds was introduced, there was a scarcity of standard works on hernia.

With the exception of Astley Cooper's work there were few in the English language, though several French and German authors had published, from time to time, short, but very incomplete works on this subject. Cooper's work, too, deals with little, except the morbid anatomy and treatment of the strangulated variety.

Latterly, however, since surgeons have essayed to directly attack and deal with the incarcerated and the reducible varieties, many productions have been offered on the subject of hernial disease. Although restricted by the title to only the treatment of the malady, yet in order to render this comprehensive and practicable, etiology and morbid anatomy must necessarily be considered here, though in abstract only, when possible. There are but few American treatises on the subject of hernia, the history of the malady being most commonly considered by our authors, as an integral part of ordinary, surgical text-books.

At the present time, what is particularly desirable is to ascertain, what the precise status of hernial treatment is; what class of cases are curable; and, what incurable. With a view of endeavoring to classify hernial cases, and by describing those which are legitimate subjects for surgical intervention and those which are not, and indicating the methods most appropriate in given cases for treatment, this work is offered to the medical profession; the views, opinions and deductions being based on a moderate experience in private and hospital practice, and on what could be gathered through a diligent perusal of the latest literature, domestic and foreign.

The treatment of any given disease, infirmity or deformity, mainly resolves itself into two principal divisions, *viz.*, the radical and the palliative, or that, in which the physical ailment or impediment may be eradicated and the parts restored to their normal structure and functional activity; and, that class of cases in which, through organic changes or inherent, intrinsic conditions, a reversion to full health is out of the question, an effort being directed only to securing the greatest medium of comfort, and we so prescribe remedies that not only is physical discomfort overcome but the prospects of ultimate recovery are greatly enhanced. Hence, we will see that to intelligently direct measures of relief or cure of hernia, it is quite indispensable that we have a correct knowledge of what may be properly designated its natural history, or, as it is more commonly designated, the clinical history of hernia and its causation. For without giving due importance to this, it is easy to understand how one might be induced to institute active surgical measures for the cure of a protrusion which, under certain circumstances, if left alone might disappear of itself.

Radical resort in hernial infirmity, then, may be instituted for palliative purposes, as in cases in which the wandering viscera may be so freed and restored that truss-pressure will readily and safely confine them. And, *per contra*, in many, palliative agents alone may occasionally effect permanent cures.

There is, however, not only a fundamental distinction in these two phases of treatment, but an enormous difference in the consequences resulting from them. For, when conservative measures *alone* are judiciously employed in the reducible non-strangulated, no harm can possibly result. But radical means, when the open incision is resorted to, are not only attended with danger to life, but as they always entail the division of supporting structures, there can be no question but in many, improperly selected cases the means instituted undoubtedly leave the part in a state favorable to a relapsing escape; and one more difficult to manage than the original.

A general impression prevails that the detection of hernia, its diagnosis and recognition, are simple. This is anything but correct.

"We must catch the hare before we can cook him," and let it be remembered that we must first positively assure ourselves

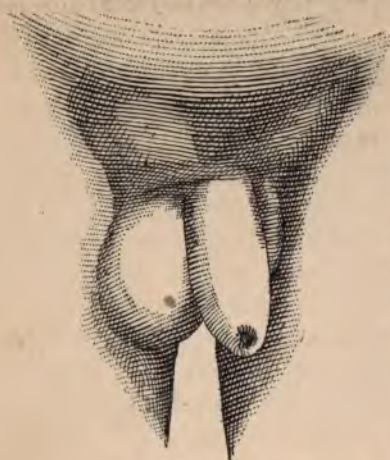


FIG. 1.

that we are in the presence of a genuine hernia before we pronounce it as such, or attempt to cure what may not exist. The diagnosis is often attended with great difficulties. Indeed, it may be said that many pathological conditions in the inguinal or inguino-femoral regions in the male, and the inguino-labial regions of the female, so strikingly simulate hernia that it may be utterly impossible to recognize one from the other. A medical practitioner not long ago came under my observation, who had an oblong sausage-shaped mass in his right inguinal region, which presented so many puzzling features that, though carefully examined by several experienced surgeons, no accord of opinion was reached. I have seen more than one spermato-hydrocele in the male adult tortured with truss-pressure and the aponeurotic structures, so weakened by years of pressure against them that, when the true state was discovered, there was great danger of an intestinal protrusion making its appearance after this was removed.

It is notoriously the case, that cysts are met with in the infundibulum of the round ligament of the female, where it splits up at the external aperture of the canal of Nuck, in the inguinal region. To the unwary or inexperienced, these might be mistaken for hernia, and the unfortunate victim of them be doomed to the painful embrace of a truss, to relieve her of a mythical *hernia*, a disease; while a simple puncture would not only give her mental rest, but likewise forever cure her of this cystic affection.

It would be well if the pathological condition under consideration could be defined by some more definite term than hernia, for, strictly speaking, etymologically it means the offshoot or

sprouting forth of something. A strict adherence to this definition would include neoplasmata, which might originate inside of or within a canal, and present externally. A prolapse of the rectum, bladder, or uterus, would also be included in the same category. The common, vulgar term *rupture*, is wholly inappropriate, as there never is rupture of any structure whatever in any description of hernia, if we except that variety in which its development follows very great violence, immediately applied to the abdominal walls.

In this instance nothing will be regarded as hernia, other than that pathological state arising from the escape of some organ or normal structure from within the cavity of the abdomen.

Hernia is essentially an infirmity or a deformity, without doubt, in the majority of cases, of a congenital origin. Although the mass itself may not always appear at birth, or at least be noticed immediately after delivery, the causes which lead to it, non-descent or mal-descent of the testis, want of obliquity in the canal, prolapse of the infundibular process, etc., obstruction or stenosis of the emunctory passages, etc., are there. It is in essence a freak of evolution, one of the many so often observed on a rigorous scrutiny at birth, and which, under a favorable environment, like the others, in the majority of cases will correct itself and disappear with the growth and maturity of the body.

CHAPTER II.

CONGENITAL HERNIA AND THE HYGIENE OF INFANCY.

Hernia is quite common in newly-born males. In many it is not of sufficient volume to attract notice until the first year is past, and the youngster takes the upright attitude and commences to walk. It usually is accompanied by no special symptoms, and only excites apprehension in the minds of the parents by its size and position. At birth the spermatic vessels are deeply covered by a thick layer of adipose tissue. The dartos and cremaster are then highly developed, giving the scrotum dimensions quite out of proportion in size to what they are in adult life. Serous cysts of the tunica spermatica and of the tunica vaginalis being very common, this condition also, with the scrotal fullness, may mimic hernia so closely that it is only by a most painstaking examination we are enabled to exclude them. On the other hand, a small fringe of omentum may come down with the cord and be completely overlooked. In congenital hernia proper, anatomical conditions favorable to visceral escape, always tend to amelioration or permanent spontaneous cure in

infancy and early childhood. It is a law of evolution, that in the growth and development of the body, the economy will invariably obliterate by assimilation or absorption such superfluous structures as serve no physiological function. It is in harmony with this law that the greater part of those diminutive, simple, uncomplicated herniæ, undergo obliteration during the period of early growth. The testis arrested in the inguinal canal continues its journey downward to the base of the scrotum; the vermicular action of the bowel and the contracting mesenteric ligament aiding in directing upward and retaining the displaced loop.

The change in the pelvic lines, curves and angles, and the transmutation of tissue; the widening lumina of the emunctory canals, in obedience to the incessant though intermittent movement of their contents, each and all contribute their share towards effecting a symmetry of perfection, and the firm closure of the inguinal, femoral and umbilical portals.

INFANTILE HYGIENE.

Nature's efforts in the direction of restoration or restitution may, however, be much retarded or accelerated by infantile hygiene.

It is certainly quite inexplicable why, in our times of widespread scientific research and extended independent observation, so little attention has been given to hygiene as a factor in effecting relief or cure of infantile hernia.

Every child born, regardless as to whether he be herniated or not, immediately after delivery is put through practically the same routine; while on the contrary, in every instance in which a hernia or a suspected hernia is discovered in the new-born, we should invariably direct special attention to it. In every case the prevalent vicious custom of applying a band or binder around the abdomen should be condemned. It conserves no useful purpose; the only excuse for it at all is that it retains the envelopes of the funis in position. If this firm, inelastic compression does not in many cases directly cause a hernia in those predisposed to it, I am confident it often very seriously interferes with spontaneous cure, by the increasing pressure which it produces against

the abdominal walls. In the herniated baby this, then, should be cast aside, the dressing for the navel string being held in position by adhesive straps, or tapes passed around the body. After the desiccated remnant of the cord has dropped off, nothing whatever in the way of a girth should be worn around the abdomen; but the garments, when the erect attitude is taken, should be all carried from the shoulders, thereby the freest possible action being given to the diaphragm and the organs of digestion. If the patient be a male, stenosis of the urethra or atresia of the prepuce should be looked for and relieved. It is well to keep this class of patients on their backs, as much of the time as possible, and, in no case, encourage or permit them to walk, until after the first year.

Their diet should be simple; devoid of a rich or indigestible aliment, but be ample and nourishing--the mother's of course being preferred. A large proportion of the ordinary variety of hernia of infants will disappear by hygienic measures alone before the end of the first year. For them no sort of mechanical apparatus should be for a moment thought of. There can be scarcely a question but that the chances of recovery are very much enhanced with this minor class, by employing no support or pressure of any kind, while a badly fitting or a strong truss may, by induced inflammation, render the prospects of cure, quite impossible without a surgical operation.

CHAPTER III.

THE TREATMENT OF HERNIA IN INFANTS BY TENTATIVE MEASURES AND MECHANICAL APPARATUSES, IN SINGLE OR DOUBLE HERNIÆ; THEIR INDICATIONS OR CONTRA-INDICATIONS IN SIMPLE OR COMPLICATED HERNIÆ.

Unhappily, in a considerable proportion of hernial cases, there are such complicating or painful factors present that we must occasionally resort to art for their amelioration or cure, as in those voluminous in size, in which a large part of the intestinal canal occupies the scrotum or labium; those which give rise to much pain, and those, too, in which there is incarceration with agglutination of the imprisoned viscera. The inguinal canal may be entirely wanting in very large protrusions. In others, there seems to be an excess of intestine, or an elongation of it or the mesentery. In others again, the omentum is in excess.

With a few, there will be an adhesion between the sac, testis and intestine, while with others the abdominal viscera are either

crowded down after the testicle, or, contracting adhesions to it on its way downwards, an independent, serous investment is wanting, and all occupy the cavity of the tunica vaginalis.

Occasionally, we will encounter a most complicated pathological condition, as, when there are simple or compound cysts within the sheath of the cord; varicose spermatic veins, and a visceral protrusion. As a rule, herniæ follow later, after the generative organ is lodged in the scrotum; but the reverse is met with in early infancy,

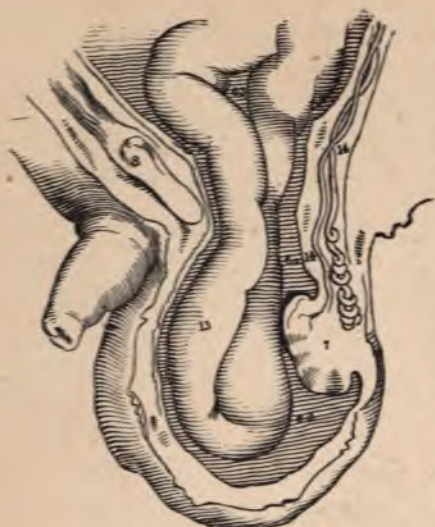


FIG. 2 (MacLise).

Congenital inguinal hernia with adherent testicle, rendering reduction impossible.

one side of the scrotum being occupied by a hernia, while the testicle is yet in the inguinal canal or above it. Sometimes the monorchid state remains through life. Double herniæ may be complicated by the same morbid arrangement and pathological changes as the single.

Congenital, inguinal, or crural hernia in females is rare, though the umbilical variety is common. This latter, however, with them as with the male, is readily cured by simple means. It is only when a hernia manifests a tendency to rapidly increase in size, or is painful in the female infant, that a retentive apparatus is necessary. As their urethræ are short, straight, capacious and distensible, permitting small urinary excretions to pass through without great straining, the protrusion, when of moderate size, is disposed to spontaneous reduction. With female hernia there is a singular tendency to the escape of the generative organs of the pelvis, through the "canal of Nuck." Strangulation is rare and almost unknown in infants and young children.

Complications then may be present, or may develop, which will render the wearing of an artificial support a necessity.

Unless such complication is present, of a clearly accentuated character, then the best apparatus is worse than none of any kind.

The mere fact that a child under a year old, free from cough or any disease entailing a severe strain on the abdominal wall, has a small, painless hernia, is no justification for the use of a truss. Certainly, should the protrusion fail to disappear under the first year, or should measles, whooping-cough, or acute bronchitis develop, a truss must be applied.

A truss on a diapered infant is a great nuisance. It is continually smeared and soaked, cannot well be kept clean, and if not perfectly adjusted, or if pressing too firmly at points, is a ceaseless source of misery to the helpless little sufferer.

Phymosis or atresia of the urethral canal, or a calculus in the bladder or the urethra, when a hernia is present, by the forced and frequent contraction of the abdominal muscles which its presence causes, seriously interferes with spontaneous return. If the hernia is of the inguinal or umbilical variety, and the impediment caused by preputial adhesions at the meatus is slight, the frequent erections of the penile body will unfold the tightened fore-skin and permit a free jet of urine to pass through, when the fullness in the groin will often vanish by slow stages. It is only in the aggravated phases of preputial adhesion that we must interfere. With many, however, if there seems to be an increase in the volume of the hernia we should not delay, for the procedure for relief is commonly a perfectly harmless one, which in any event will rather favor than retard cure.

Urinary calculi, by their size or shape, when lodged in any region of the urethra, by the obstruction which they cause, require forcible straining in micturition. A case has been under my care in which there were three calculi so lodged as to almost completely block up the urethra. Before relief was secured by the urine making its way through a perineal fistula, the little fellow would so strain as to prolapse from five to six inches of the rectum every time he tried to urinate. He had no hernia except of the rectum, and this long continued straining in no way favored

the evolution of one. It is easy to understand that should a hernia be present such straining must greatly increase its volume.

It may be repeated that herniated infants should be kept on their backs or buttocks as long as possible. By the prone attitude of the body the parts are placed in a position most favorable to recovery. As the infant advances in age he commences to notice objects, and is incessantly active while awake and cannot be kept quiet. But we can prevent him from walking and we can compel him to either sit or creep. In sitting he so crowds up the inguino-femoral fold as to cause a moderate pressure on the extrusion, which favors its absorption or return. In creeping the body is carried nearly horizontally, and abdominal pressure is so distributed as to relieve tension on the herniated region.

Very many herniæ which no doubt would disappear by a tentative therapy, often become chronic, incurable cases when children are permitted to walk too early; hence in all cases of hernia in infants, they should be permitted to creep for a considerable time before the upright position is taken, and at first be allowed to walk only for a few paces at a time until the body is accustomed to the change in attitude, and the super-incumbent weight of the floating viscera will not fall on the weakened areas too abruptly.

SIMPLE, NON-OPERATIVE MEASURES IN THE TREATMENT OF INFANTILE, UMBILICAL, INGUINAL, OR CRURAL HERNIÆ.

As so-called *ruptures* are quite commonly met with in the new-born and young children, and the parents are naturally solicitous for their recovery from a condition which, if it continues into adult years, will occasion very frequently a crippling, painful infirmity, and disqualify them for many occupations of emolument or honor, they at once cast about them for means of cure.

The family physician is first looked to. He may, perhaps, assure them that the youngster will outgrow it, at all events that it is not dangerous to life. But it remains, it may grow no less in size, possibly it increases. He is again reminded, and now, as a matter of course, orders a truss. But it may give so much discomfort that it cannot be worn, or if it can, it effects no

diminution in size, and is worn only with the hope that in time it will cure the infirmity. Nevertheless, the hernia is still there. A traveling charlatan has come to town, and with mammoth posters and innumerable hand-bills scattered broad-cast, boldly advertises that he can cure every sort of rupture. His position will also probably be fortified by a column in a local paper, filled with testimonials of divers individuals, happy of the opportunity to publicly acknowledge to suffering humanity the extent of their gratitude.

The stay of the "great man" in town is limited; hence those in need of his wonderful skill must hasten.

The little one, with a multitude of others, is spirited away for the treatment. "Advice *free*," but pay for the medicines! Yes, medicine, for a hernia; *plus* something else nevertheless. Now, this itinerant, though he may know little of anatomy and less of pathology, understands human nature; he knows his business and he produces many cures.

He gives purgative pills or powder, fluid medicines and ointments. He orders his patients on their backs, eschews farinaceous diet, with no milk, sugar or fats. Directs persistent friction, massage, and perhaps applies a roller bandage. In babies, when they had but simple, serous cysts along the spermatic fascia or congenital hernia proper, he promptly cures them all.

With the adult he doesn't fare so well, though he is often able to put their herniæ out of sight, until they cheerfully give him a testimonial, and he has an opportunity to pack his traps and decamp.

That this is no overdrawn picture is attested by the fact that even now, in our midst, there are "institutions" (?) advertised, wherein the medical *corps* claim that they can cure hernia of any description "*without either truss or operation.*"

Indeed, we find in the tenth century that Guy de Chauliac, of Montpellier, treated hernia by astringent plasters and other topical applications; as the white of an egg for a vehicle, crushed nutgalls, alum, antimony, yellow amber, etc. On a certain species the following mixture was supposed to possess great virtue: It was composed of turpentine, litharge, the fæces of an eagle freshly roasted, human blood, the hair of a ram, all blended together in rain-water and vinegar.

Some years ago a man came to me with his son, then one year old, who had large scrotal hernia on the right side, which no truss would contain. I found, on examination, that it was of the congenital variety of anatomists, with the testis, intestine and all in one common investment. It was shortly before the death of the late Dr. Henry B. Sands. He had seen the case before me, and advised against an operation. I recommended it, but the case was brought to a traveling quack, who agreed to cure the case in one week. He was paid a large fee before he would commence. He gave the patient one ounce of simple cerate, with a bottle of mint water. Of course, a cure did not result. He was again sought for, but in vain; his time was too precious for him to linger longer about New York.

It must be always remembered, in the treatment of infantile hernia in particular, that the therapeutical armamentarium is not limited to a truss or the scalpel, but that each case must be treated on its merits; and that as there is every conceivable phase of hernia, or conditions simulating the genuine, so are the remedies for its relief or cure are varied and diversified. True, in many, when we are quite assured that the inguinal or scrotal fullness, is nothing more than a simulated hernia, we have performed our duty when we have clearly set forth the innocuousness of the condition, and assured the parents of its ultimate, probable disappearance with the advent of time. Unfortunately, this is not always enough. Some old women may insist on it, that the child is *ruptured*, that the doctor has neglected it, etc., until the case comes under the care of a less scrupulous practitioner, anxious to make a name for himself, who will affirm that there is a *rupture*, but that he can cure it. It will take time, and it will take money, etc. And, he does cure the child, much to the loss of his neighbor.

ENCYSTED HERNIA AND SERO-CYST FORMATIONS IN INFANTS AND CHILDREN.

In the vast majority of cases of infantile hernia in the male, we will, on examination, discover that it has formed adhesions from its sac to the elements of the cord, or what is rarer, the contents of the envelope, and all are locked up in one or more

compartments, and are incarcerated or rather encysted, forming a sort of accessory-cavity to that of the general peritoneum. These may appear on one side, or on both, simultaneously. One may consist of the bowel alone, or omentum, or both. Encysted-hernia, however, most commonly appears singly, and consists of omentum.

It is of considerable importance to recognize a fixed epiplocele in the infant, for if it has formed no adhesions and hence does not draw its blood-supply from the serosa, it will, in general, so completely atrophy or amalgamate with the cord, as to quite disappear of itself; so that when small, painless and uncomplicated, no sort of severe or long-continued compressive force should be recommended or permitted to remove it. If we are dealing with capricious, unreasonable parents, we may always cut the career of those masses short, by various means which we will consider later. Cystic-formations are of frequent occurrence in both male and female inguinal-tracts, in infancy and early-life. In the male, anywhere from the point, at which the spermatic-artery makes its final turn and enters the lower margin of the internal-ring, down to the base of the scrotum, these cystomata may form. In the female they have very often been confounded with hernias. With women, their habitat is along the canal of Nuck, having their origin in the loose, cellular-tissue which forms the round-ligament, the analogue of the spermatic-cord. As these cysts so closely mimic a hernia in form, outline and consistence, it requires, at times, one of more than ordinary experience to differentiate them. They are painless, diminish in volume when the patient lies down, are reducible on moderate pressure, and can often, be kept out of sight, by the bulb of a firm truss.

They may appear as mono-cystic or multi-cystic, the former being the most frequent.

As they seldom attain to a great size, but have very firm attachments, they are not easily recognizable. They may be associated with visceral protrusions. These masses are often designated hydroceles or spermatoceles, terms which are permissible in the adult, but, as their pathology differs radically at the two epochs of life, we must not confound these pent-up accumulations of a natural secretion with what are essentially of a neoplastic

origin. For with the former the natural tendency is towards aggravation, while the latter, should the little-one not be cut off by some intercurrent malady, in time will invariably disappear; the only exception being with the female, in whom after the menopause these serous cysts of the round ligament occasionally take a fresh start and give much inconvenience. When cystic disease is suspected, we should determine its presence with definite certainty. For, by accomplishing this we can allay the apprehension of the parents and avoid such treatment as may do harm. In this class, if the parent or patient, is not content to wait, as in the preceding, we may institute such measures as will effect a prompt cure; though ordinarily it is better to leave things alone, depending on time to correct the difficulty.

The ancients were not so far out of the way in their treatment of hernia before the spring-truss was invented; consequently, in many particulars, it may be safe and prudent for us to imitate them, when we aim to treat epiploceles or hernial-masses along the inguino-femoral furrow. Hence, low diet, the restricted use of liquids, rest on the back, the employment of mild purgatives, friction, salves, counter-irritation, appropriate bandaging, employed alone or in combination, may be relied on in hastening the obliteration of many of those pathological conditions now being considered. These measures all possess the merits of safety and simplicity. Reduction of the aliment, fluid and solid, is exceedingly efficacious in first diminishing the volume of the intestinal contents and relieving tension; moreover, in inducing a species of auto-assimilation of the superfluous adipose elements, which give to the omentum its weight and consistence. Deprived of its fat, the omentum is but a delicate, transparent, gauze-like structure. An occasional purgative serves the purpose of unloading the bowel and diminishing intra-abdominal pressure. The dorsal decubitus, along with equalizing the circulation, favors restoration of functions, and the quiet so necessary.

We will not delay to inquire into the virtues of any special poultice, plaster or salve, though it is absurd to deny them any worth at all, for if they serve no other useful purpose, they act as *placeboes* and give mental rest; afford an assurance that we are doing something in simple cases, and commend themselves, inas-

much as they will do no harm. Revulsives are efficient, however, whether as plasters, liquids or ointments. In those cases in which the envelope of a cyst or the structure of an epiplocele derives its nutriment from the vessels of its periphery and the adjacent tissues, anything which stimulates the lymphatics will contribute towards their absorption. Kneading with the fingers and massage, possibly moderate electrolysis as a stimulant, may each by their stimulating powers act with great energy in scattering these masses, as they do in various neoplasmata or inflammatory-deposits, in different regions of the body. Warm or cold compresses so adjusted as to maintain firm, but interrupted pressure, are a valuable adjuvant.

Since aspiration has been applied in surgery with great success, we might take advantage of it, to empty those cyst-like pockets along the cremasteric vessels in the male, and those in the interstices of the round-ligament of the female child. The objections to its general employment are that the cyst quickly re-fills, unless some irritant liquid is injected after it is drained; besides, this may be attended with serious consequences, when the processus-vaginalis is continuous with the general-cavity of the peritoneum. Further, as the bladder itself may make its way into a hernial sac, the puncture of its wall might give rise to severe cystitis. The most formidable objection against the aspirating-needle is the danger of septic infection or penetration of a blood-vessel. Hence, unless in simple cysts, in the event of pressing necessity, or in the hands of the experienced, this expedient should be ignored.

CONDITIONS IN HERNIATED INFANTS AND CHILDREN, WHICH REQUIRE
THE EMPLOYMENT OF THE TRUSS.

The presence of any physical deformity or infirmity is always a source of humiliation to the parents of an afflicted child; as much, or more, than it may be to the patient when the age of reason is reached. If a well-fitting truss serves no other purpose in the growing youth, it effectually conceals this unsightly blemish without detriment to the general health. Besides, the truss properly adjusted and changed, according to circumstances of growth, exercise or occupation, is an invaluable therapeutical apparatus.

Theoretically, a truss is a support only. This is but one, however, of its functions, when the circular-spring variety is employed. It presses, as well as supports. Now, in some herniæ, this pressure produces a most salutary effect, while in others it induces many complicating and painful changes, which may render a simple hernia quite incurable, or insufferable, without ultimate surgical intervention.

It goes without saying, that a badly-fitting truss on the young or old is worse than useless. I am convinced that a truss is very seldom needed on the suckling infant, whether he have one or more herniæ, and regardless of its size or situation. It would seem, too, that those inguinal tumors remedied by the truss in early-infancy were not herniæ, or if they were they would have disappeared, if nothing had been applied in the way of prothetic appliance. At this epoch of existence, the infant being almost constantly in a prone posture, or sitting, no strain is made on the hernia; there is nothing to aggravate it, or in any way increase its volume. It is only when he takes the upright attitude and commences active exercise that factors are called into play which will force the abdominal-viscera downward. Now, with the infant's wearing apparel cast aside, and the child able to make known the demands of Nature, we may apply a truss with advantage and comfort. Before this time, nevertheless, in rare cases, the truss must be taken up. When we encounter a hernia which is reducible, which we are quite sure is enteric, and when the testicle is well down; moreover, when the pathological condition is a source of pain or considerable discomfort to the little-one, and when prothetic retention is borne with comfort, then we should not fail to give him the comfort which a truss does secure when applied at the right time. A truss is quite a manageable machine in the walking child.

Very naturally with him, as age advances and reason develops, he materially assists us. He can tell us when the truss unduly presses or chafes, and he can remove or replace it himself. It is always well in those cases of large, single hernia in children, to apply a double-truss. For, if this precaution is not taken, another hernia, in nearly every instance, will follow on the unsupported side.

My preference is for the circular spring-truss, with a well-padded, adjustable bulb. Unfortunately, the properly manufactured truss is so expensive as to be quite beyond the means of the working-people to purchase. Every one knows that the integral parts of a common truss are, simply a circular brace of indifferent steel, a strap and a bulb. The component parts and workmanship of the proper apparatus are quite different. Indeed, the former is but an imitation of the latter. When it is not within the means of one to secure the right sort of a truss for his child, then the bandage, properly adjusted, makes a valuable substitute. It is inexpensive, can be washed or cleansed without impairing its texture and can any day be cast aside and renewed without much loss. Very many simple herniæ may be comfortably returned, with a considerable proportion cured, by this simple means. The obstacle in the way of its more general adoption is the deep-rooted impression with the laity, that every hernia must have a truss, and the indisposition of parents to employ it over a sufficient period of time.

The so-called hank-truss is an application of bandage pressure; as efficient as it is simple. It consists in a couple of hanks of yarn, or worsted, the centre of each so overlapped as to form a knot, which is brought to bear over the hernial-orifice.

It exercises a gentle, elastic pressure, of the ideal description, for very many children's herniæ. It is within the reach of every-one, and requires no special skill for its application. It is highly recommended by Dr. David Milliken of New York. Truss-pressure or support is impracticable in these small umbilical herniæ, so commonly seen during the first year of life, in which the employment of the bandage greatly aids their hasty disappearance. It is only when an umbilical hernia is present that the employment of any sort of binder or girth around the infant's abdomen, is ever justified or useful. And even here, unless the exomphocele is very large and growing, with the evolution of development, it will retract without any sort of artificial pressure. This has been very fully dwelt on by Dr. Frank T. Parsons, of Northampton, Mass., in his valuable essay on "The Hygiene of Infants' Clothing." (*Jour. Am. Med. Asso.*, August 12th, 1890.)

CONSTRUCTION AND APPLICATION OF TRUSSES FOR INFANTS AND GROWING CHILDREN.

The truss for an infant or growing child must possess qualities quite different from those of the ordinary adult.

1st. It should be as light as is compatible with ample strength.

2d. It should be so constructed as to supply a local and circumferential support.

3d. It should be so made that the pressure which it exercises may, from day to day, be graduated.

Most trusses are needlessly weighty. This is unavoidable when the springs are made from an inferior quality of steel, as more of it must enter into their composition, than when the metal is of a superior quality.

A light, circular spring of properly tempered steel, plated with some non-oxidizing material, covered and padded, meets the requirements, when the object in view is to simply retain or support an easily reducible hernia.

Those knitted, elastic-belt trusses are to be preferred to any other, in diminutive reducible hernia; but as they absorb moisture readily, the rubber soon loses its elasticity and breaks, so that they must be frequently renewed.

The broad, elastic belt which goes with this truss, as it has its *point d'appui* over the lumbo sacral region of the spine, and passes low down over the weak aponeurotic areas of the abdomen, on either side, lifts the superincumbent weight of the abdominal viscera and transfers it to the back.

The second essential, local and circumferential support, is provided by this truss; the latter though in greater measure than the former. Hence, if we have a hernia which demands considerable local pressure over the rings, we must employ the springtruss.

The spring-truss, to supply the fullest measure of success, should be so adjusted that the inguinal, or circular pressure, can be readily changed or adjusted. The circular form is the most useful, for the reason that an abdominal support may be necessary for a period after a hernia has returned; when very slight, if any, pressure is needed from the bulb.

To meet the third indication; to provide a truss for the growing child, it must be so constructed as to admit of easy adjustment

when the hernia needs more or less pressure, as the case may be, and the increased proportions of the body require alterations in its dimensions or firmness. This is a desideratum difficult to meet, though a truss possessing those adjustable qualities, and of sufficiently low price, would be a great boon to the deformed poor.

GENERAL DIRECTIONS WHICH SHOULD BE OBSERVED IN THE PROTHETIC
TREATMENT OF INFANTILE HERNIA.

It will generally be admitted that all herniæ in infancy and early childhood, with few exceptions, may be cured, in which a properly selected truss is worn. But in exceptional cases the adjustment of any sort of apparatus will accomplish no good. A poorly constructed, a defective or badly applied truss, over any description of reducible hernia, may render it irreducible.

It would be worse than folly to apply an apparatus on that anatomical type, known to surgeons as "congenital hernia," when the testis and viscera are bound together by adhesions, or in the incarcerated. Nor, should it ever be applied in any case of the inguinal type until we are certain that the testis is lodged in the tunica-vaginalis of the scrotum; nor, in the condition, known as ectopic testis; unless, we have some object in view, other than retaining the protrusion in position.

In the female infant or child, before the steel-spring truss is adjusted, to avoid submitting her to its bondage and the agonizing distress sure to follow if an oversight is committed, let one be quite sure, that there is a hernia; that the fullness which we see is not a simple, harmless cyst; or that the incarcerated mass does not consist of a prolapsed ovary, or the uterus itself. Many, not well acquainted with the common, anatomical-elements of a hernia, or the evil consequences liable to follow the needless application of a truss, acting under the assumption that the instrument will prevent the growth of an incarcerated mass, as a routine custom apply it, in every case which comes before them.

It may be laid down as a rule, that when we are in doubt what the precise composition of a hernia is, the safest course to pursue is to apply no apparatus of any kind until further advice is sought. The badly adjusted truss, by exerting undue or mis-directed pressure on a reducible hernia, excites adhesive inflam-

mation, a thickening of the sac, a binding together and interlocking of what was, before it was applied, free and isolated. As the inguinal-canal is much shorter in youth, than in adult age, and as the orifices are proportionally much larger, the surface of the pad should be applied close to the insertion of the conjoined tendon, in convenient proximity to the symphysis-pubis, over the external-ring. In crural hernia, pressure should be applied, even lower down.

The action of truss-pressure in early, infantile life, should be intermittent. In proportion to the volume, age and position of a hernia, truss-pressure should be considerable, moderate or intermittent.

In direct inguinal, or indirect hernia of great size, the truss must possess sufficient firmness and stability to securely compress the viscera within the abdomen. If the hernia be of recent origin, the prospects of complete and rapid cure will be greatly enhanced; if a truss be uninterruptedly employed day and night; a strong truss in the day; while the lad is on his feet in active exercise, and a lighter and more flexible one, for the night. By this course, an opportunity is afforded for the relaxed mesentery, to regain its full contractile power; besides, as the rings and canal have been cleared of any extraneous substance, which acts as a wedge in maintaining a dilatation, an opportunity is afforded them to close in, as the canal with the growth of the body assumes a marked obliquity. It has been alleged by many, that the truss does more than support in these cases, that it excites a gentle irritation along the inner surfaces of the *fascia propria*, which tends to an atresia or stenosis of the escape-vent.

In diminutive, controllable herniæ, moderate truss pressure only, is all that is called for. Anything more than this, with these, rather weakens than strengthens, besides causing atrophy of the testis, hydrocele or varicocele.

Truss-pressure must be intermittent. This cannot be too strongly emphasized. This does not necessarily imply that we must at any time wholly discard it in special cases, but that the volume of pressure be intermittent. In many we will encounter herniæ which are large and manifest no tendency to cure, in which the daily employment of the truss is necessary. With these it

should be taken off at night, on retiring, and again applied on rising.

It will be noticed that after a varying interval of truss-wearing, the hernia has disappeared. This is the common rule in children.

Is it well, in this class, as a prophylactic against relapse or strangulation, to advise the patient to employ some sort of inguinal-support for the remainder of his life, or at least until adult years are attained?

My impression is that it is not. Very many of these herniæ return from the 20th to the 30th year, and evidently cannot be prevented by any sort of truss-support, which can be worn over a long period of time without doing damage to the elements of the spermatic cord.

In concluding this consideration of hernia and allied conditions in infants and growing children, it may be well to state that the permanency of the cures which we effect with them, depends on certain factors, some of which we can control, and others we cannot. Bearing in mind that the defective, anatomical condition which leads to hernia is often inherited, the cure of the infirmity is frequently only temporary or transient, which on slight provocation gives way to a relapse.

With those who, when they arrive at man's estate, make their living with their heads rather than their hands, and are never called on to perform severe or protracted physical exertion, the prospects of an abiding cure are greatly enhanced.

With all young, active children, who have been cured of hernia, by whatever means, the weak abdominal girth should be supported for the remainder of life by the use of a broad, comfortably-fitting canvas or leather belt. This should be light, broad and strong, so made and applied as to extend to the horizontal border of the pubis, and laterally backward over Poupart's ligament, on either side of the sacral spine. It may be tightened or slackened to suit the varying capacity of the abdomen.

It is needless to say that with the children of the poor, who have been herniated, some sort of trade or occupation should be sought for them which does not entail great strain on the abdominal muscles; and with all youths who have ever had a hernia, they should be warned against all sorts of severe athletic exercise which put a severe strain on the abdominal-muscles.

CHAPTER IV.

SURGICAL OPERATIONS FOR INFANTILE AND CHILDREN'S HERNIA.

Surgical operations in simple, reducible herniæ of children are to be deprecated. With this class they are seldom permanently curative, and when they relapse, are difficult to control with any sort of apparatus.

Very many of such operations have been reported; and one of my own cases was but four weeks old. In fact, it was declared not long ago by not a few that herniæ of every description should be promptly and radically dealt with* "regardless of age." But time has incontestibly demonstrated that this is an error; that it is as extravagant and absurd as to affirm on the contrary, that none should be surgically dealt with.

The truth, is that there are cases of infantile-hernia in which it is altogether impossible to effect a cure without surgical interference. These cases, however, are not common, though they are sufficiently often encountered to demonstrate the importance of their early recognition.

* *Championniere, Mercredi Med.*, May, '90.

VARIETIES OF HERNIA IN CHILDREN WHICH RENDER SURGICAL
OPERATION DESIRABLE.

1st. Infantile-hernia proper, in which adhesions with the testis or spermatic cord render reduction impossible.

2d. Incoercible, painful, incarcerated hernia.

3d. Female herniæ which contain within their sacs any of the generative organs.

4th. Impending or actual strangulation.

1ST. INFANTILE OR CONGENITAL HERNIA.

That, which anatomically is recognized by an absence of an independent serous-investment, and in which the spermatic-process has remained inclosed, and the processus-vaginalis with the cavity of the peritoneum are continuous, is occasionally met with. By keeping the infant on his back as much as possible, and applying either a special bandage or hank-truss over the canal, and allowing the emptied lumen an opportunity to contract, a cure is generally speedily realized. But, in some of these cases, the testicle in its descent, becomes glued to the omentum or intestine, so that the latter become irreducible by tentative methods. There can be little doubt, but many of these herniæ contract adhesions through the undue pressure exercised by badly adjusted trusses.

If the truss be too weak, or be indifferently applied, the hernia slips down, in such a way that it has to bear pressure to such an extent as to excite adhesive inflammation, or a serous effusion, which in a short time organizes and knots the intestines, omentum, testis and serous wall into one confused mass.

This species of chronic, scrotal-hernia is the most painful and lamentable known. When the child commences to walk, it steadily increases in size to such an extent as to render its concealment impossible.

Its pressure on the testis causes pain and an atrophy of this organ.

In an aggravated case of this description, which came under my care for operation, the reflex irritation transmitted to the vesical and genital nerves had caused an enuresis and uncontroll-

able masturbation in a lad of seven years. Both promptly disappeared on releasing the imprisoned intestine by radical-operation. When this type of hernia is recognized there is nothing to be gained by temporizing, but surgical intervention should be promptly resorted to. In the event of whooping-cough or measles succeeding, the dangerous strain which these may cause may be overcome if the seat of hernia is well trussed up, until they have passed away.

2D. INCOERCIBLE AND INCARCERATED HERNIA IN THE YOUNG.

Children with incoercible, or painful incarcerated hernia, are proper subjects for operation. If, for no other purpose than securing the patient comfort and placing the rupture in such a position that its growth may be arrested, and that it may be thereafter, readily retained by the truss or bandage.

When a hernia is rebellious to truss treatment of every description, or, is a source of pain; when, it manifests a tendency to rapid increase in volume, then we may consider the propriety of an operation. Diminutive, incarcerated herniæ are the least detrimental of all. But, when they contain the undescended testis, ovary or uterus, or are associated with cystic disease of the cord, and cause a constant sense of discomfort, then the question arises, whether it is not the duty of the surgeons or medical-attendant to advise radical-measures for their relief, or their possible cure. In this event, much will depend on circumstances and environment.

Female hernia of every description is more favorable to early operation and permanent cure than any other.

3D. HERNIA IN THE FEMALE CHILD.

With a hernia in a female child, in which we are quite assured that any of the genital-structures have come down with the sac, there should be no delay in cutting down at once. As we have no structure functionally like the spermatic-cord to deal with in the female, in obliterating the inguinal canal, a cure is almost invariably assured in operations on their inguinal-herniæ.

Besides, during the early epoch of life, before menstruation or pregnancy, when the vascular-apparatus of the lower-extremi-

ties is not periodically disturbed, the chances of cure resulting, after operation on crural-hernia, are greatly increased. As female-hernia, of all others, is commonly the most distressing, during adult-life, if the young female have an inguinal-protrusion which fails to disappear during the early years of growth, and which is at all painful, or incoercible, an operation may be advised.

As umbilical-hernia in either sex very rarely resists moderate pressure, during the early stages of life operative interference for its cure must be very rarely called for.

4TH. IMPENDING OR ACTUAL STRANGULATION DURING CHILDHOOD.

Strangulated-hernia during the years of bodily development is a very rare occurrence. I have never seen it, nor am I acquainted with any recently reported cases. A few instances of this pathological state are recorded through surgical-literature. They constitute some of those pathological curiosities, met with, perhaps, once in one's life-time, by those who have had the greatest opportunities to observe cases.

With these cases reported, but few of the authors have mentioned whether the patient had worn a truss or not. It doesn't appear that they were of more frequent occurrence before the seventeenth century, when the circular, spring-truss was first invented and worn, than they have been since. It is easy to conceive how a viciously constructed truss might set up an active inflammation, with resulting strangulation.

Impending strangulation in the child should be treated by immediate, radical operation, without any resort to taxis whatever. One warning should be sufficient not to again jeopardize life, by a condition which can be remedied without serious danger, when proper skill and caution are employed.

CONTRA-INDICATIONS TO SURGICAL TREATMENT OF CHILDREN'S HERNIA.

The number of cases in children, taken as a whole, which call for radical measures must be reduced to a narrow limit, but with even those, there are events and circumstances which in many should cause us to postpone the time of operation or decline to interfere, altogether. With a child who is suffering from an or-

ganic disease, or who is in a feeble state of health; unless, life is immediately imperiled by strangulation, nothing should be done until health is restored.* Félizét in a general way advised non-interference until the tenth year, or until the child had passed through measles and whooping-cough. In selecting cases for surgical-intervention we should carefully discriminate, and take none in hand, except those which we are assured will receive the intelligent and patient attention of the parents, until the permanency of cure is secured.

In no case will we resort to surgical means until every conceivable description of tentative expedients has failed, and which have been assiduously employed over a very considerable period of time.

If a patient be presented who has a very large irreducible hernia, we will not forcibly press this immediately back into the abdomen, until we have first put the patient through a preparatory course of treatment.

When an operation for the radical cure of hernia is undertaken in a child, the operator must always have it distinctly understood, that he is never able to guarantee against a possible relapse, and that operative-interference is not wholly free from danger to life.

We have now arrived at the consideration of operative-technique, but as this differs in no essential particular, in the different stages of life, it will be generally considered in another chapter.

It may be repeated, in conclusion, that the number of cases in children of hernia which are proper for operation, is comparatively few; that with very few exceptions, all hernias in the years of growth may be temporarily or permanently cured by safe and simple methods if intelligently employed over a sufficient period of time; although, occasionally, cases will be encountered of such an anatomical type, or presenting such pathological features, that sanguinary methods must be resorted to to relieve them.

* Cure Radicale Des Hernies, etc., page 30.

PART II.

HERNIA IN THE ADULT.

CHAPTER V.

A PRELIMINARY CONSIDERATION OF THE METHODS EMPLOYED IN ANCIENT AND MODERN TIMES FOR THE MANAGEMENT OR CURE OF HERNIA.

The ancient history of hernia is full of interest to the student of medicine, as illustrating, after all, how slow the wheels of progress moved in the early era of Christian civilization, and that even under the eyes of the keenest, many simple infirmities passed before them without relief.

Indeed, it seems quite beyond one's comprehension that the unfortunate, afflicted with a strangulated hernia, was always inevitably doomed to die unrelieved unless, perchance, an abscess formed and intestinal obstruction was relieved by an artificial anus, until a comparatively recent date. Or that the unfortunate victim of reducible-hernia had no other means of controlling or carrying his large eventration than by the use of a bandage or a bag. In-

deed, until the time of Franco—the commencement of the sixteenth century—the strangulated were *all* abandoned to themselves to die. The spring-truss was unknown until the latter part of the seventeenth century. The victim of hernia was an object of scorn and ridicule, denied access to society, and shut out from positions of honor or rank, and was always truly a deserving object of commiseration and sympathy. But as the scepter of the chirurgical art passed from the hands of the Arabians of Asia to the Greeks, thence to the Romans, to be, in turn, handed over to the polyglot, progressive, tireless, modern races of Europe, an enormous awakening was imparted to all the arts. Science, in response to the Baconic philosophy of modern times, made gigantic strides, until now it would seem that we were approaching the millennium. Applied art has enormously improved our treatment of hernia.

The spring-truss will cure the majority of the herniated. And with the greater part, of those on whom it fails, it will, along with securing comfort and security besides, so effectually conceal the infirmity as to prevent detection under the ordinary clothing.

The treatment of strangulation has reached such a degree of perfection that to-day surgery, early and judiciously resorted to, should save every life. It will be seen then, that modern-art has wholly revolutionized the management of hernia; has stripped it of many of its dangers; has obliterated its unsightly proportions, and even made its total and complete cure the rule and not the exception.

With the history of the past before us, the marvellous advances made in the treatment of hernia in the past two centuries, who should despair of realizing the time in the near future when an incoercible, incurable hernia will be a very rare infirmity?

How, indeed, was it possible that surgery could make any progress whatever in those times, when the dissection of the dead body was sternly prohibited, and the profession knew nothing of the thousand expedients which modern therapeutics have placed within our reach? Let it not be forgotten that systematic, methodical chemistry is a product of the nineteenth century. Of electricity, the anæsthetics and antiseptics, even our eighteenth century brethren knew, practically nothing.

Surgery itself, could scarcely, have been said to rest on a secure superstructure, until the present century. Celsus, in the first cen-

tury, as far as we can learn, was the first who essayed to cure hernia by the incision; as, we will see later on; but the agonizing torture necessarily connected with an operation involving such sensitive parts as are concerned with the anatomical-elements of a hernia, was so great, that few could muster courage to undergo it. And, of them we are told, so few survived the tetanus, hemorrhage, or inflammation which followed, that operations of this description soon fell into disrepute.

With the advent of the anæsthetic-era radical-operations were again revived, and finally individuals proclaimed that they could cure every sort of hernia. One* of the most blatant and notorious of this class, has but quite recently passed from among us. A considerable mortality, however, attended those operations; and, moreover, many of the hernia relapsed. From the early days of Velpæue until about twenty years ago, but few sanguineous operations were undertaken for the cure of reducible-hernia.

Lister had promulgated his doctrine of antiseptics. If, before this time, surgeons were chary of instituting procedures which entailed the opening of serous cavities, the division of muscular-tissue, or the loss of blood, now the way seemed clear for surgically sweeping away, everything which could be reached by the scalpel or saw. Much mutilation was done, in the reckless impatience of the surgeon to obliterate at once what might have been disposed of by safer and simpler means. Very naturally hernia was given no quarter; its etiological factors, anatomical composition, or pathological changes, counted for nothing. What was simpler, than the cutting down on, liberating and releasing, a loop of intestine and closing the gap? At first thought, to the most skeptical or conservative, this question would seem difficult to answer. A score or more different techniques were devised in Italy, Germany, France, England and America, which each inventor alleged, seldom, failed in his hands.

It seemed at one time, that the truss would be cast aside altogether, as a barbaric relic of a by-gone age; as it could certainly, have no place in hernial maladies, when they all were radically, remediable by the scalpel. Promiscuous hernial operations, however, have had their day, at least for the present. The most san-

* Heaton, of Boston, Massachusetts.

guine operators, with few exceptions, have made it a *sine qua non* that always after operation for a considerable period of time, a truss should be worn, or some sort of bandage support. Those who opposed operations; facetiously inquired where the "cure" came in, when the continuous use of the truss was necessary after, as well as before, operative procedures.

The temptation to perform these operations is very great. They are attended with but very slight danger to life, and for the time, at any rate, effect an apparent cure. In the succeeding pages, after tentative methods have been considered, an effort will be made to indicate the class of cases which justifies sanguinary-intervention, and describe the various methods in vogue, in the past and present, for the radical-cure of hernia.

CHAPTER VII.

INDICATIONS AND DIRECTIONS FOR THE EMPLOYMENT OF THE TRUSS AND OTHER SUPPORTS DURING ADULT LIFE.

It is evidently, demonstrable to every-one, that as there is a wide distinction, structurally, between the hernia of a child and that of an adult, it follows that there must necessarily be a corresponding difference in the mechanism and adjustment of the apparatus worn by the latter.

There is this fundamental difference in the purposes for which the truss is employed in the years of growth and in middle life. In the former, truss-treatment is applied, not only to support the hernia but to cure it. With the latter, however, the apparatus is employed mainly to confine the protrusion, so that it cannot escape during active or forcible movements of the body.

Adult herniæ with few exceptions, are relapses of the cured infantile. They may return gradually or suddenly. If the term "*rupture*" is appropriate in any phase of hernia, it is with some of these recurring cases. For, it is scarcely conceivable that the fibrous columns of the inguinal apertures can, on the application

of abrupt violent force, sufficiently yield and stretch without laceration of the inner or most exposed fibres, and evolution is abrupt. As intra-abdominal force, particularly, in the upright position, is very considerable, it constantly tends to increase the bulk of a reducible hernia, which widens the gap in the abdominal wall; when a truss which exerts a firm, steady grip, is demanded. With the active, or those employed in laborious occupations, this is all the more imperative.

The child may, with perfect impunity lay aside the truss, from time to time; but, this is a hazardous practice with an adult, unless, he employs great caution. The greater part of strangulated cases, which have come under my direct care for operation, has been among those who had laid aside their trusses, and in an unguarded moment, of sudden strain, the intestine came down and was strangulated.

The truss for the adult should have a considerable but an adjustable, compressive force, so that the wearer, after his day's toil, may slacken the pressure to such a degree as is compatible with comfort and safety.

There is a limit to the strength and pliancy of even the most superlative quality of a spring truss. The wearing of a truss in the adult male should be relatively intermittent. The wearer and the instrument itself are benefited by relaxation. As the man lies down and removes the superincumbent weight of the abdomen's contents from the weakened inguinal walls, the truss is loosened and laid aside. This should be done only when the horizontal decubitus is assumed. And the truss should be readjusted by observing the same precaution on rising.

It would be a great advantage to truss wearers if they could have a change of apparatuses, as they have a change of shoes or other wearing apparel; one for severe, protracted every-day strain, and one for evenings or holidays. It would afford them infinite comfort, and no doubt the apparatus would wear much longer.

The manufacture of well-made trusses is an industry which entails a very high degree of skill. In most of the nations of continental Europe the truss-vendor confines himself solely to the manufacture of this one prothetic apparatus. A great many

factors should be considered in the proper selection and adjustment of trusses. The volume, position, age and peculiarities of the special hernia must be considered; the complications, sex, occupation, etc. Does the patient, preach, orate, sing, or play wind-instruments? Has he asthma, or chronic bronchitis? Is he constipated habitually, or has he a stricture? If a woman, is she single or married, suffering from a tumor or pregnant? Indeed, as no two herniæ are quite alike, so must the mechanical adjustment vary.

The same general rules which should be observed in the application of a truss to inguinal hernia, apply to the crural variety. As this rupture is most common in women, and seldom attains a great volume, it is often borne without any support. Although, it is small it is more unmanageable than the inguinal, and it requires a firm truss, the bulb of which should be applied low down and farther in, than with those occurring above the femoral arcade. By a wise provision of Nature, strangulation is not liable to occur during the throes of labor. In a diligent search through hernial-literature I can find no case of stragulation occurring simultaneously with the parturient act. This is explained by the changes which take place during the progress of pregnancy within the abdominal-cavity. We will notice, that as the uterus expands under the stimulus of conception, it balloons upward and backward, out of the pelvic basin, thereby raising and carrying posteriorly the intestine; the anterior, massive wall of the uterus itself lying in almost direct contact with the fascia-Cooperi, on either sides.

There are many herniæ located in the inguinal and crural districts which will not tolerate a spring truss or any sort of severe pressure. These constitute what are known as painful or incoercible herniæ.

Besides these, are others which are complicated with spermatocoele, hydrocele, sarcocele, or other pathological complications of such a character as to interdict the employment of a truss. When there are circumstances in the way of radical operation for this class, they commonly continue gaining in volume, until there is almost a total eventration of all the floating viscera. The case represented in this plate, No. 3, is one in point.

It will be noticed that the penis is obliterated, nothing but a dimple in the integuments remaining to mark its former site.

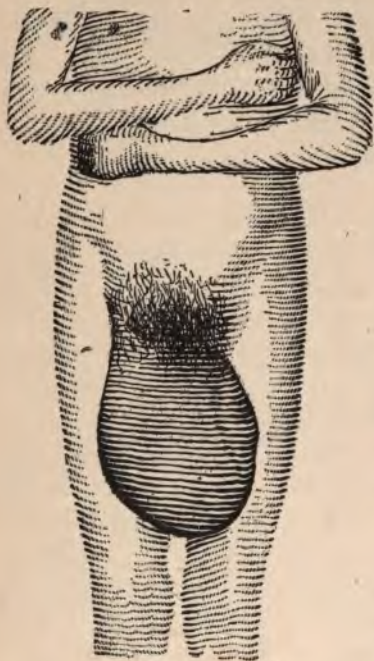


FIG. 3.

The patient carries this immense mass in a canvas pouch, which is supported by a strap passing over the neck and shoulders. In order to secure this photograph, the support had to be removed, and in consequence it will be noticed that the spine is inclined inward and the shoulders are stooped. The scrotum has the appearance of containing a double hernia, but it does not. It is wholly unilateral and limited to the right side. The right spermatic-cord has lengthened to more than two feet, in an upward direction from the testis, which is lodged, immediately, under the skin at the base of the scrotum, by the inguinal aperture. On the left side, although the constant dragging of the scrotal bag has

greatly deranged the normal anatomical landmarks, yet it is clearly apparent that the inguinal and crural canals are hermetically sealed on that side. The left testis is within four inches of the corresponding external aperture, at the summit of the hernia. This man suffers no inconvenience from this condition, which entails, the nearly complete digestion of food outside the cavity of the abdomen. Its weight alone annoys him, though when it is well swung, he has no discomfort of any kind. This is an aggravated example, of a not very rare class in old men. These mammoth herniæ are peculiar to the male sex in advanced life.

The cuts on the preceding page illustrate the enormous dimensions which hernial masses may attain, and what modern surgery may accomplish in their management.

This case was recorded in the London *Lancet* of December 12th, 1891, by Dr. B. Murray.

The hernial tumor commenced with a small, inguinal-epiplocele on the right side; the glands in the folds of the extended

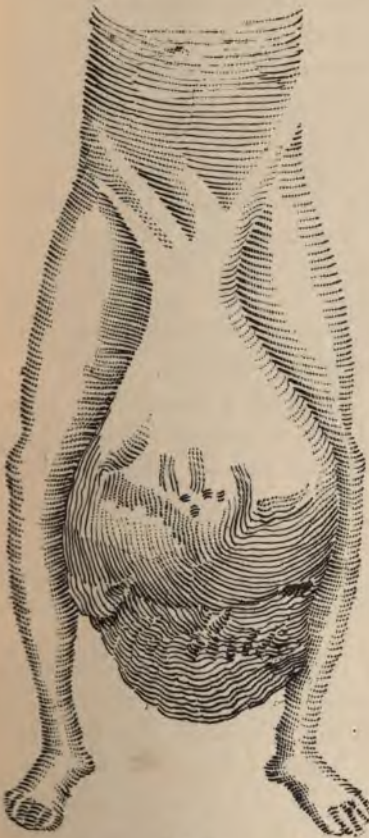


FIG. 4.
Right Inguinal Epiplocele. Weight before operation a little more than 100 lbs.

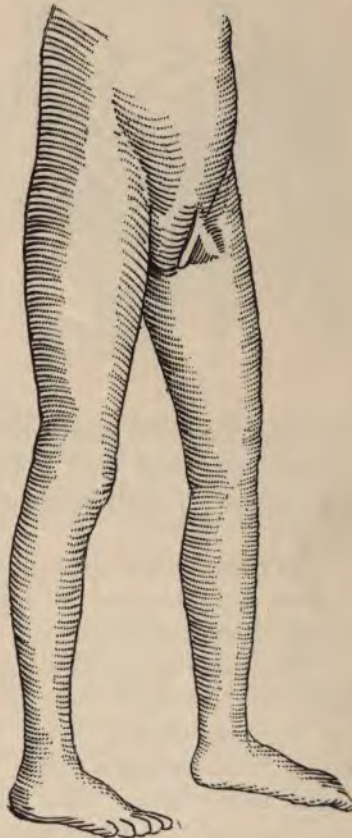


FIG. 5.
Same, after operation.

omentum undergoing hypertrophic, adipose changes; until, a neoplasm was formed, which, on its ablation, weighed a little more than one hundred pounds. The cutaneous structures covering the lower segment, were cut away, but the external genito-urinary apparatus was entirely spared. This man must have had something

more than an average muscular development to carry *himself* about. It appears that he always wore a shoulder harness, with which he lifted and deposited his ponderous scrotum.



FIG. 6.

It is interesting to note, the broad attitude of the lower limbs, assumed in order to make room for the mass; and, besides, to broaden the surface of pedal support. That singular power which all tubular structures possess of contracting and lengthening out, is here beautifully demonstrated; the elongated urethra, vasa deferentia and spermatic vessels immediately returning to their normal length, on the weight which dragged them down being removed.

There are a considerable number of herniæ in old men, which no truss can control, or on which it cannot be borne with comfort. Little can be done for these cases, except to apply a suspensory bandage. The more rest the better.

As these herniæ, seldom cause strangulation, and the victims of them are advanced in years, nothing more than a palliative-therapy is ever permissible.

There are many tumors, of a hernial character, consisting mostly of fat lodged along the external apertures of the femoral and inguinal canals. They are of small volume, firmly incarcerated, and occasion little or no inconvenience. They cause mental worry rather than physical pain, and give apprehension only, because, those who have them feel the humiliation of being *ruptured*.

When the protrusion is within the inguinal-canal, this bubonocoele is generally so situated that, unless a very cautious examination is made, a mistake in diagnosis may be committed, and a lymphatic-adenitis of the groin may be treated for a hernia. And, on the contrary, a genuine hernia may be mistaken for enlarged glands. Such a case came under my care in my Harlem-hospital service, in

the spring of 1891. I was called in the night, to operate on a young woman who had been just sent in, by her physician for treatment of internal-obstruction of the bowels. I found her collapsed, cold, and almost pulseless. The house-surgeon informed me that there was no hernia, but my hand passing under the clothing came on to a firm mass in the left groin. This, she said, she had since childhood. The tissues over it, however, had an œdematous, doughy feel, and, on moderate pressure, it was exquisitely painful. She admitted that for a day or two it had considerably increased in bulk. As her general condition did not admit of a pulmonary anæsthetic, the tumor was opened under cocaine. An old, omental protrusion was found anteriorly, firmly adherent to the femoral vein, and behind it a fresh mass, which nipped a coil of the intestine as it entered the crural canal. Fortunately, her recovery was uninterrupted. There is a large number of herniæ which are greatly benefited by the *rest treatment*, conjoined with manipulation, massage, or pressure and electricity.

To this class, belong, the recently incarcerated, the incoercible, rapidly-growing, and those presenting symptoms of approaching strangulation. We have seen, how the recumbent posture, favors the cure of hernia in the infant, by aiding nature in her process of evolution, and it is well to ascertain if, after the growth of the body, we cannot rely on this agency as a useful therapeutic factor. We will invariably observe, that when the general-health is seriously disturbed, when an organ or a limb is compromised by disease or accident, Nature immediately forces the body into a state of rest. It is not perhaps, as well known as it should be, that rest, is an adjuvant of incalculable value in a great variety of functional and organic ailments. If travel (recreation, change of air and exercise) is the "positive pole" in hygienic-therapeutics, rest is the "negative," and this is particularly true in hernia.

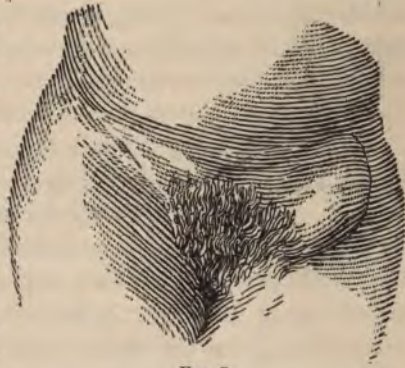


FIG. 7.

Certain varieties of adult-hernia may be cured by rest alone; *physiological* rest.

Rest must be utilized in a relative, rather than its positive sense. The patient, to secure a cure, if following a laborious pursuit, must discontinue it. If an athlete, he must discontinue feats of agility. If a performer on a wind-instrument, he must lay it aside. In other words, if he would give rest to his hernia, he must discard everything, which exercises undue pressure on it, or which, perhaps, even caused it.

It is said, if you would cure disease, first remove the cause. But there are many maladies, the cause of which cannot, always be removed. This certainly is the case with many phases of hernia. Unhappily, too, there are not a few, among the poor, suffering from hernia, who cannot abandon a trade or occupation, on which, perhaps, a family depends for its sustenance. By a wise provision of Providence, however, most herniæ are not encountered among hard-working people, but rather among those best able to comply with a necessary hygiene.

Many times it has been my good fortune, to see herniæ which had suddenly become painful and irreducible, by the aid of rest in bed, a soothing inunction, and a sleeping draught, quietly retract and disappear in one night. With others, of greater age, volume and sensitiveness, by the employment of massage, kneading, bathing and graduated pressure with a flannel bandage, after a varying period from a day to a week or more, they too have returned; and, if not, they have been greatly reduced. Dr. J. Collins Warren, of Boston, at a meeting of the American Medical Association, in Newport, R. I., reported several cases of unmanageable, large, old herniæ, which were rendered quite coercible and comfortable under the truss, by treating them with rest on the back and intermittent pressure.

With those rapidly-growing in spite of supporting measures, when the escaping mass threatens to attain great dimensions, we may often interfere in this way with the most salutary results. But, in order, to derive the greatest benefits, it may be necessary to confine our patient in the recumbent posture over a considerable period of time; besides, methodically, directing treatment to the immediate seat of the hernia.

It is almost needless, to again speak of the marvelous power of rest in aiding the restoration of a strangulated intestine; for, it is well-known to hospital-surgeons that often, when taxis has totally failed, by the use of a hypodermic of morphine, elevation of the hips and a few hours undisturbed repose, the constriction at the neck will slacken and the hernia disappear of itself.

Before leaving this part of the subject, it may be desirable that we have a correct knowledge of the therapy of rest, when applied to the treatment of hernia. Exclusive of the manner in which change of occupation and cessation of active muscular exercise act, rest relieves and sometimes cures:

1st. By relieving the herniated area of the weight of the intestines, which, in the erect posture, falls on a weak vent, on an opening in the over-strained, thinned, aponeurotic wall.

2dly. By clearing the dilated canal of the visceral plug, which tended to constantly widen it, an opportunity is given to the fibres of it, to contract, and hence, narrow the portal of escape. Although, it is assumed that aponeurotic, fibrous-tissues possess but slight, if any contractile power, it is not so, with the cremaster muscle in male, inguinal hernia. In this variety of the malady, we will invariably find the fibres of the cremaster-muscle enormously hypertrophied; so that, it is but reasonable to suppose, that when once the viscera are returned, this will so contract, as to aid very materially, in closing the lumen of the sac.

The dorsal decubitus favors the equalization of the circulation and relief of the congested state, which previously contributed towards enlarging and fixing the hernia. In the hernia of females it is notorious, that the distress in standing just before menstruation is always very marked, while great comfort comes from rest on the back at frequent periods.

When a hernia has been recent, and its sudden passage downward has started up a sharp inflammation over the entire surface of the sac, if it can be now returned and fixed without strain, until these plastic surfaces become glued together and obliterated, a cure may be affected.

3dly. In those massive herniæ we must commence our attack, by placing the body at rest, then by massage and gentle pressure, continued until the rings through which this mass escaped,

relax and permit its return. They will very often severely test one's patience; but if we are gentle and persistent, we will often conquer them. An opening through which a hernia escapes, should permit its return; and it generally will, except in certain strangulated, and in cases, attended with promiscuous and intimate adhesions; though, we should always remember, that its escape was gradual, almost by imperceptible stages, and now its return must likewise be slow and cautious. Having reduced it, it must be confined to the abdomen until the hernial orifice has had time to contract. A most aggravated case of this description, I have seen wholly disappear after three weeks treatment in bed; though as a prophylactic against its return, a truss was worn. Local bathing, douching, massage and galvanism, each serve a useful purpose, conjoined with rest in many cases in which there is a vascular stasis of the cord and in the loose tissues enveloping the sac. In many, old herniæ, no hope need be entertained of effecting the return of the serous envelopes or sacs; for their adhesions are firm and extensive; nevertheless, a practical cure of them may be secured with the sac *in situ*. If we, in any manner secure the obliteration of its lumen, the end is attained, just as effectually as if the *fascia propria* itself were completely enucleated. This closure of the lumen is brought about by contraction, by plastic inflammation, and by atrophy. Physiologically, the contraction of the circular fibers at the orifices of a hernial canal retain the viscera in their position, while pathologically this same contraction may induce interstitial changes in the escaping structures which it embraces, and they may even, by spasmodic action, induce serious symptoms through the violent pressure which they bring to bear on the imprisoned viscera in strangulation.

CHAPTER VII.

MECHANICAL TREATMENT OF VENTRAL PROTRUSIONS, IN ADULTS, MALE AND FEMALE.

In this class are grouped:

1st. Umbilical hernia.

2d. Hernia in the upper abdomen, the umbilicus, central and lateral.

3d. Hernia through the abdominal walls, below the umbilicus, but above the inguinal zones.

These might be further subdivided into those of a pathological and those of a traumatic origin.

This group taken as a whole, in both sexes, after adult years are attained, is the most unmanageable and incurable of all herniæ.

UMBILICAL HERNIÆ.

These are rarely met with in men, but in child-bearing women are not very uncommon.

Many of them though hopelessly incurable, are nevertheless borne without serious inconvenience, and comparatively rarely jeopardize life.

Of late years, since neoplastic formations have become so common in women, and very many pathological conditions of the female, internal generative organs have been radically dealt with, through incisions in the abdominal walls, hernia has occasionally occurred through the incision cicatrix. These I have designated laparotomy herniæ.

These protrusions, commonly known as umbilical, strictly speaking should not be so designated; for, but a very few of them emerge through the centre of the navel orifice or carry with them the urachus or round ligament of the liver.

On the contrary, they usually emerge either immediately above or on either side of the umbilical scar.

The accompanying (Fig. 8) is a photograph of a very aggravated case of umbilical hernia in a woman thirty-eight years old, which came under my care. She did not notice any umbilical deformity till the birth of her first child, ten years previously. With



FIG. 8.
Mammoth Typical Umbilical Hernia in Female.

each of her successive, four confinements it increased in volume, till now, when unsupported, it hangs down on the pubes. It will be observed, that it protrudes through the median line, and is spherical in outline. The integument which covers it is as thin as parchment. Its contents are intestinal, which are wholly irreducible. She carries it in a sling, and without much inconvenience, and performs the duties of a house-keeper.

This anatomical arrangement is not of much consequence in prothetic treatment, but, as will be observed later, it has its importance when a surgical operation is undertaken. We seldom

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see hernia through the muscular planes, above the umbilical horizontal line, except in the child-bearing. This area of the abdominal enclosure is least exposed to pressure, or to the surgeon's scalpel in laparotomies.

In certain child-bearing women, however, with loose, flabby fibre, in whom the foetus during pregnancy attains a rapid and considerable development, as the uterus mounts upward the floating viscera are confined within reduced limits. The same occurs in dropsy of the amnion. Should the patient in this condition make a sudden strain, or be subjected to vomiting or coughing, something is apt to give; to *rupture*; and we will have a thinning and expansion of that wedge-shaped plate of aponeurotic substance, which lies between the diverging ascending recti, or else a tear through its inner lamina, to be succeeded by a genuine rupture, with a bagging forward over the umbilicus of the viscera. This may be of limited proportions, or of considerable extent.

As a rule, after confinement, when the gravid uterus is emptied the umbilical viscera recede backward, into their normal abode, all morbid pressure is removed; when, if moderate support is provided over the weakened gap, all traces of the deformity disappear, until another pregnancy; when, it may return.

In neglected cases with women bearing many children, this condition may remain, though it rarely gives much inconvenience.

In my service at the Ninety-ninth Street Hospital, in the autumn of 1885, an elderly woman came under my care who had a large projecting mass extending from the ziphoid cartilage downward. Below the navel the abdomen was rather retracted and flat.

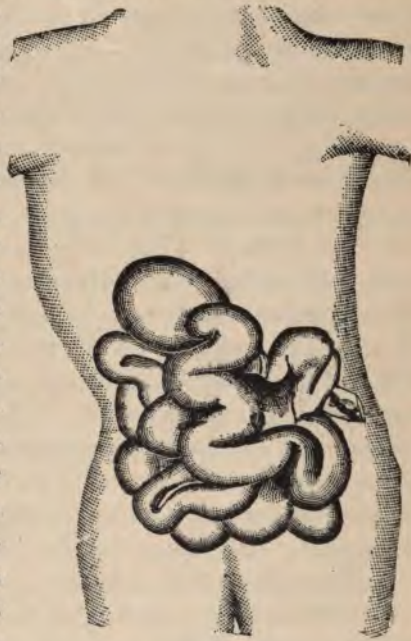


FIG. 9.

A Voluminous Exomphocele with its Investments dissected away.

We could secure, but an imperfect history from the woman. The physical qualities of the fullness inclined me to regard it as a new growth. But at the autopsy it was discovered that it consisted of a hernial extrusion, which had split the inner fibers of the aponeurotic fascia; and, in this manner made its way outward. The sac contained the gastro-hepatic omentum, all of the transverse colon, and the greater part of the small-intestine, from the pylorus.

IRREGULAR VENTRO-ABDOMINAL HERNIA OF CHILD-BEARING WOMEN.

The inner surfaces of the abdominal recti, from the umbilicus down to the pubes, lie flush to each other, nothing separating them except their sheaths in the male sex and in non-child-bearing women. On the contrary, however, with the mothers of one or more children, there may be a well-marked interval dividing these muscles, varying from one to several inches. Pregnancy in many women of modern life, over-fed and under-exercised, whose foetuses are large, fat and plump, puts the muscular planes of the abdomen on a great strain, often so much over-stretching them that they never quite recover their tonicity after labor, or the fibrous structures are so far over-stretched that a complete return to their former integrity is quite impossible. The mother then is left "pot-bellied." The belly hangs over the pubic brim. The recti muscles have so far diverged, as to permit the greater part of the abdominal contents to occupy this hiatus, caused by the want of muscular support. With women so burdened, if there be but little adipose tissue present, we may at times quite distinctly feel the vermicular movements of the intestine through the thinned integument. These bulging masses in the lower mesial plain, like those above, are not attended with any danger to life. They are not commonly classified as herniæ, though ætiologically and pathologically they are quite identical.

They derive their greatest interest from the deforming effects which they produce, and from the fact that many of the most aggravated cases of this description, if seen early in young women, may be averted or wholly cured by simple means.

LAPAROTOMY-HERNIA.

Laparotomy hernia constitutes a distinct type. It may develop in any region of the abdomen into which a blade has

entered. I have seen a hernia follow a stab wound, inflicted by the smallest blade of a penknife, in the left lumbar region. The wound was a mere puncture, yet when the patient recovered and took his feet he had hernia. One case occurred in a boy who had a well defined perityphlitic abscess, which was opened directly down on end, and drained through a small opening. There is no manner by which they can be completely obviated, when the *fascia propria* is penetrated. Many devices have been suggested to prevent them, such as cutting through muscular-tissue rather than aponeurotic, when selection of site is permitted; the homologous and independent approximation of tissue in closing in the incision; but none of these expedients will always secure the patient against their development, though without doubt, when drainage can be dispensed with, the latter is the most reliable and efficient. They have a morbid-anatomy of their own. They are the most ungovernable of all hernia, and exhibit a persistent tendency to increase in size if the greatest vigilance is not exercised. As they possess no independent, serous investment they are not prone to strangulation.

PALLIATIVE TREATMENT OF ADULT VENTRO-ABDOMINAL HERNIA.

The treatment of ventral-hernia resolves itself into mechanical and preventive measures.

Umbilical herniæ of small size, as they commonly give no discomfort, require no special treatment. It is only when they manifest a tendency to increase in size, or threaten strangulation, that they require a truss or support. A simple flannel or canvas broad belt, with a pad adjusted, is usually as efficient as anything. With those of great volume, all that an apparatus can do is to support them.

Large, irregular protrusions, occurring above or below the umbilicus, arising in consequence of the long-continued intra-abdominal pressure of pregnancy or parturition, require rather preventive than direct treatment, though the latter, in many, is efficient.

If the abdominal girth is put on a great strain, by a distending uterus, then an auxiliary, circular support, which will transmit the superincumbent weight from the muscles and aponeurosis to the strong, powerful column of the spine, should be applied, and its use continued till after confinement.

It has been seen, when the remedial-agencies of infantile-hernia were being considered, that the protracted rest on the back or side during lactation in the infant, was a potential element in cure. It is interesting to inquire, as to the utility of rest, after confinement as a preventive against hernia or visceral displacement.

We are told that among savage, non-civilized races, the mother is on her feet the day after the birth of her child. This is the common custom with North American Indians, living in their natural state. As the mother during *enciente* life pursues her usual, active occupation, and is sustained on the non-stimulating, precarious diet of the prairie or forest, her muscular system preserves its firm fiber, and her offspring is born small, lanky and devoid of fat; its average weight being from two and a half to four pounds.

With many, too, of our own working women, they rise after the second or third day.

The conventional period is *nine days*. In average cases this probably is long enough. But with the easy classes and with those who have borne many or very large babies, no doubt by prolonging the time and giving the abdominal muscles an opportunity to contract and recover their full tonicity, the tendency to median, aponeurotic expansion and bulging forward of the viscera would be largely overcome. Obstetricians are divided in their opinion on the necessity of the post-partum binder. The late Professor Charles A. Budd used to say, that he could never see that it served a useful purpose, but he advised its employment nevertheless, because it always gave the patient *comfort*.

Surgically, the binder is an artificial girth, which affords rest to the abdominal muscles, now thoroughly fatigued from long-continued violent muscular effort.

It is essentially a bandage, fulfilling the same functions in this instance over a temporary traumatized region of the body, and to my mind always serves an invaluable purpose in civilized communities.

There can be scarcely a doubt but a considerable number of those large hernial pouches which appear along the median-plane, as well as in those attributable to a free lateral sagging of the oblique and transverse muscles, are in the greater number of cases

caused by improper adjustment, or too early discontinuance of the bandage or binder after confinement.

Embonpoint is pronounced, the body fills out in normal pregnancy after the fifth month. The intestinal-canal itself no doubt also shares in this hypertrophy. Constipation is common, and the intestine in order to overcome the impediment from uterine weight enlarges in its calibre and is much thicker in its muscular coat, so that there is an actual and positive increase in its volume. Labor ended under favorable conditions of hygiene, involution once more effects full restoration.

Many of these cases here described may be remedied, and the normal symmetrical outlines be restored by treatment.

The individual should be placed on a light, easily-digestible diet. The bowels should be kept open, and plenty of exercise may be taken when the flabby abdominal walls are trussed up. Electrization of the muscular walls, with small hypodermic injections of strychnine into the muscles, massage and douching sedulously employed in selected cases, each and all contribute towards re-establishment of tonicity in the abdominal walls. In those obliged to do laborious work, or in women considerably advanced in years, little can be done.

TREATMENT OF LAPAROTOMY-HERNIA.

For laparotomy-herniæ we can accomplish little when they have attained a considerable size. As they are not reducible generally, they cannot be confined by any adjustment. And having no independent fibro-serous investing wall or sac to limit them, after the viscera have left the cavity of the peritoneum, they wander in every direction under the integuments between the muscles and cellular tissues. When they first appear, if they consist of omentum only, should adhesive inflammation fix them in the opening which they have made, and all severe straining be avoided, they may not swell in volume or advance any further. But when they are large and swing over the abdomen, the best we can do for them in the way of prothetic support, is to substitute an artificial for the peritoneal sac.

There are aggravated types of this infirmity in young, healthy women or men, which may be successfully dealt with by operative measures, but to be effective they should be employed early.

PART III.

CHAPTER IX.

THE RADICAL CURE OF REDUCIBLE AND IRREDUCIBLE HERNIA BY DIRECT SURGICAL INTERVENTION. ITS ORIGIN, PROGRESS AND PRESENT POSITION.

We have already, in a general way, dwelt on what retarded and what accelerated many great scientific truths, and what has cleared the way for the pioneers in the healing-art, who, by their industry, toil and genius, have earned for themselves an imperishable fame in teaching mankind the art of preserving health, overcoming deformities and prolonging life.

An historical description of ancient methods, devised and practiced in the early times, though attractive and full of interest, would have but little practical value in this century. For in those days little was accurately known of structure or function, and the facilities of the nineteenth century were wholly unknown. Yet, withal, as many are under an impression that the

operative-field in hernia was a *terra incognita* until the very recent past, and as hernial-operations, with different objects in view, have at various epochs been performed on a large scale, a superficial perusal of the more ancient literature,* may not be without interest and some advantage.

In reviewing this part of the subject, we discover that for centuries those afflicted with hernia were objects of scorn and contempt. The victims of the infirmity were degraded, and what was the most lamentable of all, when a hernia became strangulated, if palliative means failed to overcome it, it was left undisturbed, and the patient allowed to perish unrelieved, as it was only in the beginning of the sixteenth century that strangulation was treated by division of the tissues. Encouraged by the successes which obtained by intervention with the scalpel, reducible and complicated herniæ were promptly treated by sanguinary measures, which caused a large mortality. In the seventeenth century the spring-truss was invented; and now it was discovered that with several, simple support would efface many herniæ. Operations became unpopular. In the beginning of the nineteenth century, in spite of the claims of the spring-truss, it was in many instances being cast aside, when Gerdy, Wood, and others introduced a cure by invagination. This method, however, was short-lived, and passed into oblivion with its authors.

The history of the radical cure of hernia is contemporaneous with the time of Celsus.

This famous surgeon was not an extreme partisan of surgical interference, although he operated many times with successful results. The precepts which he formulated eighteen centuries ago cannot be much improved on, even now. Not only did he prescribe the age most favorable to success, but he likewise indicated the modification of procedure in the varying types of the infirmity. He directs a few incisions, resects the sac, and jealously guards against doing injury to the elements of the cord or testis. The omentum was cut away, and the surface of the stub was charred with the hot iron. We do not gather that he operated on

* I am indebted largely to M. Paul Segond's valuable treatise for many data on the historical part of this subject. "*Cure Radicales des Hernies*," edition 1st.

exomphoele. We find no mention of crural hernia by him, or any other author until the eighteenth century.

It would appear that he regarded all hernia as having a peritoneal investment, though he clearly distinguishes two varieties, *viz.*: One, in which the protrusion is caused through a slipping and stretching of the peritoneum; and, another, by a rupture, or tearing of this membrane.

Oribase appears in the fourth century. He makes no mention of operation for strangulation, nor does he speak of elastic pressure, which was a very ancient expedient; but confines himself to only the reducible, incarcerated, and adherent, which he dealt with by means of a keen-edged instrument. His writings, however, reveal a remarkable fertility of genius, and many of the features of his technique have been utilized by operators of our time. Like Ball, of Dublin, "he twisted the neck of the sac and resected the dependent part." His directions as to the manner in which we should proceed in complicated cases are very minute and precise. He made a counter-opening in the scrotum. He does not say how durable his cures were, but it appears his mortality was large; some dying from hemorrhage, others from peritonitis, and many more from pyæmia. Oribase regarded a lively inflammation over the seat of operation, as indispensable to secure permanent results.

Ætius and Paul, of Ægina, in the fifth century, recommended and practiced operations on reducible-hernia. They divided hernia into two grand varieties, to which they attached great importance, *viz.*: One, by rupture of the peritoneum with a brusque advent and violent symptoms; the other, occurring by an elongation and distension of the peritoneum, of a slow, imperceptible and painless development. Umbilical-hernia of every description they undertook to cure. Their steps in operation varied but slightly from the latest we are familiar with. In inguinal hernia, when the intestine came down into the scrotum, they removed the testis on that side, but when the omentum appeared this was excised and the testis retained.

In enterocoele, after a long incision was made, and the testicle stripped, it was confided to an assistant, and the spermatic cord moderately drawn on, when a double threaded suture was passed

through the inner pillar of the ring and out above, in such a manner as to firmly close the canal and tightly compress the vessels of the cord. The cord was now divided and the incision closed.

With bubonocoeles a similar incision is made through the integument; the omentum drawn well down and cut off; its vessels ligated and then returned. The divided sac is now closed, invaginated on a sound passed up the inguinal canal. After remaining *in situ* from three to six days the sound is withdrawn and the opening closed by granulations.

From the time of Æginus, which witnessed the fall and destruction of the Alexandrian school, the art of surgery passed from the hands of the Greeks to the Arabs and Europeans. With the latter until the sixteenth century, the time of the Reformation, medical science and religion were associated together. Departing or driven from Toledo, a number of physicians, mostly Jews, scattered through the south of Italy and founded the school of Salerno, which gave to the world the celebrated Constantine, who enriched the treasures of surgical knowledge by the translations of Hippocrates and Galen. Salerno became the most celebrated of the Italian schools, the recognized scion of its Arabian predecessor.

It was this great centre which produced Roger of Palermo, Roland and the "Four Masters." But towards the end of the twelfth century Salerno had to encounter a formidable rival at another extremity of Italy, in Bologna.

In Italy, in the time of Roger and Rowland, surgery had largely fallen into the hands of empirics. The greater part of those, says Brunus, who practiced the healing art in those times were rustics, fools and imbeciles, the most depraved and the vile, presumptuous women, who feared nothing. At this time, the same state of affairs prevailed in Paris, where nearly all the surgeons were clergymen; who regarded any sort of surgical operation as beneath their dignity, and every description of manual function as beneath them; leaving to the barbers, scarifying, leeching and bleeding. Lanfranc himself never opened the abdomen for ascites, never operated for hernia, nor cut for stone.

A surgeon then had to prepare to deal with a reign of empirics, charlatans, and traveling operators; the "cutter for stone," Hernialists, those who "punctured for cataract," "bleeders,"

"extractors of teeth," men and women. They cut and slashed, mangled and mutilated the inhabitants of ancient cities and villages. They promised to cure every sort of hernia, castrating every patient, and to such an extent that they threatened to strip the country of its most virile and useful citizens. Now those in authority interfered, and, by the severest edicts, the progress of those merciless mutilators was arrested.

Nevertheless, in spite of imperial edicts, castration was in vogue for a long time. In Montpellier, Balésere de Tarante castrated lepers, and Peter of Borsia, castrated for simple hydrocele. Indeed, castration was practiced not only among charlatans, but by accredited surgeons, and was so well recognized as a cure for hernia, that in the eighteenth century kelotomy, literally speaking, was understood as synonymous with castration.

Guy de Chauliac represented the surgery of the fourteenth century, and in him was incarnated Arabian science. Not only, had he given the precise methods for radical cure of hernia, but also clearly and fully set forth appropriate cases, with their immediate dangers and probable results.

He divided hernia into two great classes: (1). Umbilical. (2). Inguinal. As his predecessors, he recognized hernia by stretching of the peritoneum, and by rupture of it. Though a frequent operator for hernia, he had great faith in the efficacy of bandaging, plasters, topical applications and regimen. He is said to have cured patients of sixty and eighty with local medicaments alone.

It is reported, however, that he resorted to methods which savored of quackery, for he claimed to possess a secret preparation, compounded by himself alone, which he administered in a peculiar fashion. His patient being placed on his back, with a metallic plate over the hernial tumor, which was firmly compressed by a bandage, he commenced to dose the patient with his favorite powders, which, he claimed, after their full therapeutic action was developed, would, by a violent attractive power which they possessed for the metal, draw the hernia upward into the abdomen.

Theodorus, Crevez, Pierre and Lanfranc each, in various ways, resorted to caustics, chemical and thermal.

Arsenic was the favorite ingredient applied directly over the ring when the hernia was reduced; beginning on the surface its

erosive action, it ceased only when it had divided the spermatic cord and penetrated deeply. The patient was confined a long time to bed, and when he survived the ordeal, he was required to wear a support for thirty days. Others ligated the sac, removed it and then freely cauterized the pedicle and adjacent tissues with the potential cautery.

Franco, after having removed the sac, staunched the hemorrhage and freely exposed the canal; lightly touched over the nude parts with caustics, in order that the succeeding inflammation might be rich in plastic, cicatricial material, and therefore offer a more solid and resisting barrier against the re-descent of the hernia.

The *Point Doré* was devised, it is said, by a Swiss named Metheus, in the eighteenth century. Master Metheus operated by pursuing similar steps to his predecessors, in exposing the canal, liberating the spermatic cord, and dividing the sac; but he employed a suture of gold, with which he approximated and fixed the inguinal rings in such a manner as to seal the canal, yet preserve the cord. It is said that Ambrose Paré gave it a trial, but soon laid it aside and condemned it.

At this time (the fifteenth century) two traveling charlatans went through England curing hernia. Their method was essentially the same as those of Metheus, employing a metallic suture to approximate the pillars of the ring.

It is evident, that for a very long time the principle of pressure, as an auxiliary, to the cure of hernia was known; hence, we find Marcus of Pavia, Bartholomew of Padua, and others contemporaneous with them, employing a wooden-pad of a conical form, secured in an elastic-bandage to overcome the most refractory hernia.

Ambrose Paré was a warm partisan of the massage-treatment in the hernia of young adults; when they were recent, an emollient aromatic ointment being always employed in conjunction with it.

In the more rebellious, he reduced the intestine by taxis, and then closed the breach *en masse* by carrying the suture from side to side, through and through, all the while guarding the vessels of the cord.

Paré also resorted to a species of invagination, for the cure of inguinal-hernia. He employed an ivory plaque with a strong curved needle, the eye being in its convexity. This was fixed in a firm holder.

Having reduced the hernia, he seized the integument and adherent sac, pressing the cord aside, and introducing his ivory between the cord and the sac, carrying his needle around with heavy silk, behind this, through all the tissues. In this way the lumen of the sac was closed and the suture firmly tied, remaining in place from ten to twelve days.

This simple method is said to have been introduced and first successfully practiced, on a large number, by Benditti, a Spanish empiric.

In 1665 a Dane named Scullet, described a new procedure for hernial cure. This consisted in reducing the bowel, then, imbedding and fixing the testis in the canal. This was so successful as to receive the royal approval, and was regarded as an infallible measure. We are informed that he gathered in an immense fortune through its employment.

Louis XIV, purchased at a high price, from Prior Cambrières, a remedy which he engaged to keep a solemn secret, until, the death of the prior, so that the secrecy of the remedy was sacredly guarded.

The distribution of this "royal-remedy" was made with great pomp before Blégnny, and the royal procurator. The famous remedy (?) consisted simply in nitrate of potash dissolved in spirits of wine, which was to be taken for twenty-four days; and, an astringent plaster was applied over the hernia.

During the treatment, the patient might be about, on foot, but he must not ride horseback, or in a carriage, but always walk or go in a boat, in the meantime, wearing a firm bandage.

George I, of England, on discovering so many men in his army with hernia (1 in 8 soldiers), didn't hesitate to give £5,000 and a pension of £500 to a notorious empiric named "*Little John*," who claimed to possess a "sovereign remedy" against hernia.

"Little John" after being idolized in England, crossed the straits with his remedy, to France. In this country, he met with bad results from the start. His method was a brutal and tortur-

ing one. He scarified over the sac, applied vitriol and pressure. He operated unsuccessfully on one patient three times, finishing by inducing a slough of the scrotum and loss of the testis.

In the seventeenth century Nicholas Seguin introduced a truss, which he alleged would cure hernia so effectually that sanguineous-operations should no longer prevail. Saviard Thevinin, became engaged in a dispute about the priority right to a certain apparatus worn in hernia, with curative effects. Blégný was proceeded against as a charlatan, and under an injunction (*une lettre de cachet*) was for eight years confined in the Bastille. The ambulant operators for this infirmity, castrated so generally, at about the middle of the eighteenth century, in Holland, that the authorities ordered every-one, publicly lashed, who operated without special permission for the cure of hernia; or unnecessarily castrated. At about the same time, in France, Robert de Housse was sentenced to three years servitude in the galleys, for ligating the spermatic cord in ten cases; in which, mortification of the testis followed. Mary Ann Presse, of Rheims, who had practiced castration on four herniated infants, in each case followed by death, was publicly castigated and imprisoned for seven years.

Hernial operations were again revived with great ardor in the middle of the eighteenth century, by Petit, Garengéot, Le Dran, Richter and Heister. The various symptoms of hernia, the anatomical mechanism and pathological changes were minutely and exhaustively studied by these eminent surgeons. Richter, in his famous treatise on hernia, lays it down with great emphasis, that bloody operations are out of the question in every description of reducible, non-strangulated hernia.

Jean Louis Petit denounced operative procedure for every species of hernia, except strangulated, and in those uncontrollable and painful. The views of his contemporaries, Gauthier, Maget, Bodenhan, La Condamine, and Bicêtre, were in like respect conservative. Desault and Boyer operated on none, except those located in the umbilical region. They used the ligature in effacing the fibrous pouch, and required their patients to wear a support for six months, after the parts had healed.

Reneuline, Lagavanne, and Fabricius Hilandus, all had abiding faith in the efficacy of rest. The latter reported a man of

ninety, who had been cured of a large incoercible hernia, by repose alone; he having been confined to bed continuously for six months.

It may be said, that at the beginning of this century (nineteenth), the radical cure of reducible hernia by sanguinary operations had been definitely abandoned. It was the general opinion at the time that all the operations were dangerous to life, and that none of them were radically curative. Percival Pott would have every one hung who undertook a hernial operation, unless life was threatened.

It would seem, however, from the writings of Lawrence, Bichat, Scarpa, Beaumont, Schumacker, and others, at the beginning of the present century, that they had in certain rare cases resorted to hernial operations for reducible hernia. Operations sustained a crushing blow in the classic writings of Boyer, who explained in great detail the *modus operandi* of truss action, and of Astley Cooper, who operated in his lengthy career on nothing but strangulated hernia, and generally disapproved of all others. Very naturally, the inventors of trusses profited by the cessation of operations. "*Medicated*" trusses came into vogue, "possessing marvelous healing powers." A plant, possessing "wonderful properties," John Dubois had discovered. The tree grew in Cyprus. Dubois was a graduate in medicine, and wrote a lengthy brochure on the subject. The book closed with testimonials of cure from many of the leading citizens of the realm.

This is something like the Chinese system of curing hernia, as described by Mr. Duhalde, in the fourth volume of his travels in China. The Chinese commence by reducing the protrusion, washing the integuments and then applying the juice of *gin-seng* and another plant named *keon-ki*. The patient is then restricted to a diet of rice, bread and water, with sheep's kidney. The patient is said to be radically cured in six days.

In France the most singular claims were made for the curative properties of various medicaments. Verdier, a hernial surgeon, published in 1818 an article in which he claimed radical cures of hernia by pills of the muriate of mercury.

Hernial operations, however, were again pressed on the notice of the profession in 1855, when there appeared the pro-

cedures of Velpeau, Leroy D'Etoilles, Bonnet, Malgaigne, Mayor, Guerin and Thierry. These distinguished surgeons confined themselves to the inguinal variety mainly, although Bouchacourt described a method for treating umbilical hernia. In Germany and England operations for reducible hernia failed to become popular at this time.

When Gerdy died, the loss of his powerful advocacy and support of intervention was felt, and in a short time again little was heard of surgical intervention in simple hernia.

Wood, in England, in 1865 commenced to cure hernia by invagination. Heaton, of Boston, had attained to great notoriety in curing hernia in 1855, by subcutaneous injections into the inguinal canal. In 1875 and later Schede, Nussbaum, Czerny, Reisel and Socin, taking advantage of anæsthetics and antiseptic protection, began to treat many cases of reducible hernia by surgical intervention. In France Championnière was the first to treat reducible hernia by operation on a large scale. The invagination operation was practiced on quite an extensive scale in England and Germany long after it had become unpopular in the country in which it originated.

It possessed the merits of being a bloodless procedure, was not very dangerous to life, and when it did not cure it generally left the hernia in a position by which it was more easily managed by a truss. But it was a painful and tedious method, and caused so much irritation in many that it could not be completely carried out.

Wützer, of Bonn, Rothmund, of Munich, Spencer Wells and Mr. Redfern Davies, of London, treated many by the invagination of the scrotum. Each had a peculiar mechanical device of his own, yet all aimed at essentially the same object. The treatment lasted from seven to fourteen days, after which the patient must wear a light truss for three months, and abstain from all active exercise for a considerable time.

THE MANAGEMENT OF THE SAC IN REDUCIBLE AND STRANGULATED HERNIA.

Heister, in the eighteenth century, was the first who recommended and practiced the preservation of the sac. The theory on which this was introduced was, that as the cavity of the peritoneum

was not opened there was less tendency to shock or danger from consecutive peritonitis. There were many adherents of this plan who persevered in its practice until very recent times, but for reasons which will be later detailed it finally became unpopular.

Birkett, in Holmes' System of Surgery, cites the views of Lawrence on the question of the radical cure of hernia, as viewed in the time of this distinguished surgical authority, who said: "The subject of a strangulated hernia submits to an operation in order to save his life, but he whose hernia is reducible endangers his life to get rid of an inconvenience, for which an operation affords no greater prospect of entire recovery than he had without it. For after he had undergone an operation at the hazard of his life the complaint may return, and the only protection against a relapse is to wear a truss."

Velpeau * tells us that Garangéot and Steffens dissected up the sac, folded it into a *peleton* (pad) and fixed it in the canal as a plug, in all operations for strangulated inguinal hernia. This is what Professor McEwen, of Glasgow, is doing in our time with reducible hernia of the same type. Kocher's operation is essentially the same. The only exception which Garangéot made was in epiploceles, when, instead of the sac he employed the omentum to block the passage.

Their aim in more ancient times was, as is ours at present, to obliterate or plug the outlets with new tissue, with the omentum, testis, sac, or integument.

The venerable Gross, in the seventh and last edition of his famous treatise on surgery, speaks thuswise of radical cures of hernia: "Various methods besides the truss have been suggested for promoting the radical cure of hernia. Some date back to a very remote period of the profession, and partake largely of the rude nature which characterized the practice of the older surgeons. To this category belong excision of the sac at its neck; its incision, with the application of irritants, for the purpose of inducing its obliteration; all of which resulted in much suffering, besides the loss of many lives. What surprises one is not that these operations have been practiced in ancient times, but that they should have been repeated at a comparatively recent period. In scrotal

* *Malad Chirurg.*, Vol. II, 3d Ed., p. 224, Velpeau.

hernia the testes were often extirpated with the sac, and so common had this practice become in the seventeenth century that Dionis asserts that a certain itinerant operator was in the habit of feeding his dogs with the organs thus removed. Hardly less cruel and unscientific are some of the more modern devices for radical cure of this complaint, especially that of Belmont, which consists in exposure of the neck of sac and introducing gold-beater's skin, with a view of exciting adhesive inflammation."

Bonnet recommended acupuncture of the sac in reducible hernia, after the intestine had been returned into the abdomen. After the needles had excited suppuration pressure was applied. This was in 1836. Of fourteen cases thus treated, eight failed, four were cured, and two died.

Pancoast, of Philadelphia, and Velpeau, of Paris, invented a method for radical cure, which was based on the same principle as that employed in treating hydrocele. The intestine was reduced, and strong iodine tincture injected into the sac, after which firm pressure was maintained. Of these operations, Gross says, successes "were few and far between."

About twenty years ago, Dr. Joseph H. Warren, of Boston, attempted to revive the operation of Heaton, though he injected the tincture of iodine, instead of extract of oak bark.

By an ingeniously constructed syringe the liquid was sprayed either along the interior of the empty elongated neck, or into the walls of it, or just outside, into the interspace.

Dr. Gay, of Boston, in 1870, gave this mode a thorough trial, operating on eighteen cases, with the following results: Five cures, eight benefited, and five failures.

Dowall, of Texas, thought he had discovered a manner of operating which would cure reducible hernia, and so enthusiastic was he at the beginning that he wrote a lengthy monograph on its technique and results, but like many others of its predecessors it was ill-fated and short-lived.

Dr. Jamison, of Baltimore, described a singular and unique method of treating hernia many years ago. He operated on a young lady, who had a large inguinal hernia, with an immense outlet. Stripping the sac, he returned it into the abdomen; then he took a tongue-shaped flap of skin from the region of the Fal-

lopien ligament, and having pared the edges of the ring, he secured this with many sutures, in the breach, between the pillars. The graft became imbedded firmly in the hiatus, and this autoplactic procedure is reported to have cured her infirmity. Although this venture can be regarded as little better than a barbarous mutilation, yet, so great an authority as Velpeau spoke in high terms of it. The late Professor Amsby, of Albany, employed setons, passed through the sac. They were occasionally moved "to and fro," to excite adhesive inflammation.

Karnochan employed this plan on six patients. It was shortly discontinued.

MISCELLANEOUS METHODS EFFECTING OR FAVORING RADICAL CURE.

Different authors mention various severe cases of reducible and incarcerated hernia, which underwent permanent cure, while those who had them, were confined to bed, suffering from serious disease or injury. Many cures of reducible hernia have been reported through the "rest treatment" by Hilandus, LeDran, Pott, Hey, Earle, Cloquet, Bramsby and Astley Cooper, Heister, Schmucker and others.

Dr. J. Collins Warren, in Boston, recommended for treatment of adult non-strangulated hernia, that the patient be placed on the back, the bed partly inverted, *i. e.*, the head lowered and the feet raised, a sort of Trendelenburg position, with constant elastic graduated pressure over the hernia. This same identical mode was first introduced thirty-five years ago by Maisson-neuve, for large, recent inguinal or femoral hernia. This had been designated "Cure by Posture and Pressure."

Mr. Kingdom, of the London Truss Co., and Dr. V. P. Gibney, of the Hospital for Ruptured and Crippled in New York, both report a large number of cases, as coming under their notices for trusses, who had been reported as cured by operation.

One of the most notorious and remarkable charlatans that ever posed before the American public, was Heaton, of Boston, Mass. For fifty years he was known far and near; and during that time plied his craft with such a large measure of success that the herniated, from all sections of the United States and Canada, of all castes and classes, flocked to him for succor and to be cured,

so that in a short space of time he reaped a large fortune. He claimed that hernia of every description was curable; and at least convinced the people that such was the case. Not finding the West a congenial atmosphere for his progress, he immigrated to Boston; and on his arrival had the audacity to invite the representatives of the medical profession to see him perform his operations. They did not accept his invitation, and he at once became a martyr.

The public press espoused his cause, and he soon derived the benefit of being gratuitously advertised the world over. He made a triumphal tour through England; was wined and dined in London, as one of the greatest benefactors of the age, and re-entered the "Hub," a more popular man than he ever was before. Little wonder that he was lionized, for those who came to him with large old incoercible hernia, for which the most eminent surgeons could offer nothing better than a stiff truss, left Heaton cured.

Like Prince Mattei, of Bologna, he kept his method a profound secret.

It certainly is inexplicable; this strange fascination of mankind for the mysterious. In no instance in medical history was this more conspicuously demonstrated than in the case of Heaton.

Dr. Heaton was a regularly qualified physician, and one would think, that inasmuch as certain types of hernia are by their very nature absolutely incurable, he would not have the unblushing effrontery to proclaim to the profession and public alike, that *none* were beyond his skill, when they applied early for relief.

So deep-rooted and widespread was the faith, which even the medical profession had in this strange individual, that finally the American Medical Association was forced to take action.

It was regarded as puerile folly, to expect men to close their eyes to the evidence of their own senses, and allow their prejudices to stand in the way of the acquisition of knowledge.

Heaton had the secret. "He might die without revealing it." Hence a committee of the American Medical Association was appointed to wait on Dr Heaton, request permission to see his operations and report their observations on their utility and value.

This was in the year 1851. The committee was composed of Drs. Geo. Heywood, J. Mason Warren and Samuel Parkman.

Heaton declined to permit the committee to witness any of his operations, or give them his secret nostrum.*

The committee, though they were unable from any inspection made, either to admit or deny the efficacy of any of Heaton's claims, reported at the next annual meeting, "that there is no surgical operation at present known, which can be relied on with confidence, to produce in all instances, or even a large proportion of cases, a radical cure of reducible hernia," * * * * commenting on which, later, Dr. Heaton says: "I affirm to be false *in toto*."

In 1872 Heaton's work appeared, edited by Dr. Davenport. The spell was broken. He gave to the world his precious (?) discovery which, when stripped of the charm of secrecy, no one seriously noticed. In this monograph he says: "I lay it down as a cardinal principle in all operations for the cure of hernia that any inflammation, except the mildest grade, must be carefully avoided. If the surgeon cannot operate without producing the four cardinal principles of inflammation, as laid down by Celsus, viz.: "Pain, heat, redness and swelling, he had much better let his patient alone, for such a result can not do good. Gradually convinced of the truth of the above consideration, I have, for a long time, patiently sought for practical means of avoiding inflammation, and after eight years of discouraging experiment have discovered a process which I call *the method of tendinous irritation*." He claimed that active inflammation prevented the wearing of the *truss* or *bandage*, something so necessary in his radical cures, to be worn six months or more. It is better, he said, to wear it a long time than for too short a time.

His injection fluid was composed of one-half ounce of fluid extract of quercus alba, with 15 grains of the solid extract of the same. To this was added a grain of morphine.

Sparton's operation for radical cure consisted in invaginating the sac, perforating it with a corkscrew which had a wide spiral, bringing the point out through the upper wall of the canal and threading it with a suture, leaving it *in situ* from four to five days,

*J. C. Warren, on Hernia. Introductory.

then withdrawing it and filling the canal with a metallic plate, which was secured by two sutures and retained in place until the parts consolidate. According to Spanton, this operation is specially suited to congenital inguinal hernia of young children.

CHAPTER X.

THE MORE ANCIENT METHODS OF TREATING STRANGULATED HERNIA.

It has been seen that, until a comparatively recent date, the victim afflicted with strangulated hernia, in those cases which did not admit of relief by other than simple means, was left to die without operative intervention.

As the anæsthetic properties of ether were wholly unknown till the fourth decade of the present century, surgeons were often driven to other expedients when called to relieve this always grave class of cases.

Simple and tobacco clysters, purgatives, general bleeding, emetics, baths, postural treatment, and other expedients were resorted to with the hope of overcoming resistance.

It was seldom that an operation was undertaken until all other measures failed. Surgeons possessed of even ordinary skill were comparatively rare in those times. Besides, in the absence of anæsthetics, dexterity and rapidity of execution were a *sine qua non*, but few who had unusual opportunities ever acquired these faculties. In consequence, a hernial operation on one bordering on

collapse always entailed so much torture, and was attended with such an enormous operative mortality, that few could steel themselves to put a patient through the ordeal, except the stout-hearted, or the adept.

Indeed, Saviard tells us that but few left the table alive after this operation, in the eighteenth century.*

Heister had such faith in the relaxing power of tobacco that he declared if it were employed early enough every strangulated hernia could be reduced without cutting.

An interesting incident is related of the manner in which he became an advocate of cold-water douching as an expedient in strangulation. Being called to a young man who had a strangulated hernia, he brought several of his students. Tobacco clysters and taxis were tried in vain, and the hernia could not be reduced. While hesitating as to what course to pursue, an old woman came along, and quickly poured a pitcher of cold water over the tumor, when it suddenly disappeared from sight in the presence of the much chagrined surgeon.

Taxis, or digital compression with forcible reduction, is an expedient of great antiquity. And to-day, in spite of all which we have accomplished in the operative therapy of hernia, we must regard it as the safest of all measures in the treatment of strangulation, judiciously exercised. In former times it was often attended with more pain and distress, and with, perhaps, less success in affecting reduction than now.

However, it is obvious that when the patient was brought to a state of collapse by exhaustive emesis, by phlebotomy or tobacco narcosis, he must have been rendered quite insensible to moderate pain.

We have been unable to devise anything yet which will replace digital taxis, and from what can be gathered, the same essential technique prevailed in the past as at the present.

THE MANAGEMENT OF THE SAC IN FORMER OPERATIONS FOR STRANGULATED HERNIA.

While the earlier operators for reducible hernia, usually, with detail and clearness, described their management of the sac in

*Saviard *Leçons Chirurgicales*, Ed. 1st, p. 134.

cases for radical cure, we are left in ignorance of how the sac was treated when kelotomy was first performed for strangulation. It would appear, however, that until the time of the illustrious Petit, the beginning of the present century, that the seat of stenosis or stricture was always regarded as being in the neck of the sac. Hence, in all cases this was freely opened and the constriction divided from the inside.

But Petit wrote with great force and conviction against the practice, and proved that in the majority of cases the constriction was in the tissues external to the pedicle of the tumor; that the opening of the sac was not only unnecessary, but was fraught with danger, and greatly added to the peril of the operation. He also claimed that in those cases in which sac and all were returned *en bloc*, relapse of the hernia was less frequent.

His writings in Continental Europe greatly influenced operations, so that with few exceptions this reduction *en bloc* was generally thereafter adopted. In the British Isles, however, Petit's views were only adopted by but very few, until 1850, when the question was again revived, and was powerfully advocated by Aston Key and Mr. Luke. Their appeal to the mortuary tables appeared to speak with such conclusive force against penetrating the serous pouch in strangulation, that many had to admit that it unquestionably added an element of danger to operations for relief.

In Gay's statistics on hernia in Guy's Hospital, for 1856, it appears that when the sac was opened in operation for strangulated hernia, the mortality was 60 *per cent.*, and in those in whom reduction was secured under operation without opening it, but twelve to the hundred died. It must be understood, that those cases in which the sac was opened were the most serious. One would have supposed that the introduction of antiseptic methods in more modern times would have removed the objection against dividing and exploring the sac, as older operators were restrained from exposing the viscera through a fear of consecutive inflammation following. Such, however, is not the case. Speaking on this point, in his latest edition on surgery, when the antiseptic theory was in full blast, Gross says: "Since Aston Key's essay, the method of returning the hernia *en bloc* has met with much favor,

both in this country and in Europe, and is now justly regarded as one of the established operations in surgery." In the United States it has not attracted as much notice as its real merits deserve. This eminent author, nevertheless, did not hesitate to open the sac, though he was never in accord with antiseptic methods.

Erichsen, writing in his "General Surgery," 8th edition, (1885), page 788, says: "If in operations for strangulation, on division of the fasciæ, overlying the neck of the sac, the hernia can be reduced, it of course would be unnecessary to lay open the sac, and the patient's chances of recovery would be greatly enhanced, more particularly if the operation be performed on old scrotal hernia of large size."

Thomas Bryant promulgates essentially the same views, 3d edition (1882), page 471, declaring, "that when the cause of the constriction is found outside of the sac, as is usual in femoral hernia, the opening of the sac is rarely necessary, division outside being all that is required. The surgeon who opens the sac in every case, clearly often does what is unnecessary."

In the very latest and one of the most valuable works which we possess on operative surgery, that of Frederick Treves, Manual of Operative Surgery, edition 1st, page 512, volume II, it is affirmed, "that as a general rule the sac should be opened. In a few cases in which the strangulation is recent, and the symptoms not severe, and in which but slight attempts at taxis have been made, the sac may be left unopened and the hernia reduced, without inspecting the gut. In every doubtful case, however, the sac should be opened."

THE SUBCUTANEOUS SECTION OF THE STRICTURED NECK OF THE STRANGULATED SAC OR DIVISION OF CONTRACTED RING.

Bouchut,* of Paris, was the first who recommended this method of treating constriction by subcutaneous division of the stricture. He advised it only when the operator was quite assured that the contractions were in the circular fibers of the ring outside the sac. He reported many successes in operations for strangulated femoral hernia in women by his method.

* Bouchut, Oper. Chirurg., Hernie, etc.

In 1852, the Pancoasts, father and son, and a few others in America, adopted the operation, after Bouchut's directions, but they soon gave it up as unsatisfactory and attended with more than ordinary danger.

THE MANAGEMENT OF MORTIFIED OR GANGRENOUS INTESTINE OR OMENTUM IN THE PAST.

From what can be ascertained through a search of ancient literature, it appears that for a time after operations came in vogue for strangulation, the suspected or actually gangrenous intestine was treated in two ways only. It was either returned into the abdomen, or it was opened and an artificial anus secured.

Sir Astley Cooper, and many others contemporaneous with him, advised that in all instances in which the gut was suspected, or only in the incipient stages of gangrene, it should be replaced in the cavity of the belly.

There has been, for a long time, much difference of opinion about the proper treatment of the omentum in strangulation. Some returned it *en masse*, when free from mortification, while others not fearing hemorrhage or subsequent inflammation, which, it was alleged, it might give rise to, excised it at the inner outlet.

In the latter part of the last century surgeons commenced to open the intestine and empty it, in those cases in which its increased volume rendered its return difficult after the sac was exposed in strangulation. This practice was initiated in Germany by Mohedenkon, and practiced by Mein, Roggenbau, Krüger, Kollreuter, Graffe, Ludwig, Roeke, Löffler, Dax, and Kelacker; in France, by Lenoir, Nélaton, Gosselin, De Roubaix, and others.

Resection of the intestine for gangrenous hernia has been successfully practiced, says Gross, since 1727, by Ramdohr, Dieffenbach, Koeberle, Kocher, Haggendorf, Nichodain, Czerny, Mohedenkon, Miner, Roggenbau, and Bird, of Illinois.

Early in the nineteenth century, Astley Cooper, Callisen, Guthrie, and Brodie, had successfully experimented in resecting the intestine of the dog, but in every case in which this line of practice had been applied to the sphacelated bowel of a patient suffering from hernia, death speedily followed.

CONCLUDING OBSERVATIONS ON THE OLDER OPERATIONS.

So far has been traced the history of hernial treatment for the simple, reducible, incarcerated and strangulated, in the infant and adult, and in the male and female; in times when the means for readily effecting hæmostasis or combatting inflammation were unknown or imperfectly understood; before pulmonary anæsthesia or the analgesic properties of cocaine were thought of. This review has been indispensable, before the subject of the various operations of our time for reducible or strangulative can be studied. By it we have seen what has been done in the way of curing reducible and irreducible hernia, the degree of success attending interference and the extent of mortality.

In strangulated hernia an endeavor was made to reach the consensus of opinion on the question of the treatment of the sac.

When anæsthetics came into vogue and the antiseptic theory became practically a doctrine, an immense impetus was given to operative surgery, and of all the regions of the body there is none, perhaps, if we except the generative tract of women, in which a greater revolution has been wrought than in the hernial regions—the inguinal and femoral—of men and women when occupied by hernia. Yet with all this advance, it must be said with all candor, that we can permanently cure but few reducible herniæ by operative interference, and that the mortality following operation for strangulation is considerable yet. Nevertheless, some substantial progress has been made of late, and methods have been devised which favor cure in proper cases, and operations for strangulation are being followed by a greatly reduced mortality, so that a great incentive remains for us to continue our efforts with a view of finally devising such a technique as will be attended with the least danger to life, and the greatest prospects of permanent relief of the infirmity.

CHAPTER XI.

A FEW GENERAL OBSERVATIONS ON OPERATIONS FOR RADICAL CURE OF REDUCIBLE AND IRREDUCIBLE HERNIÆ, AS PRACTICED AT THE PRESENT TIME.

Although there is a considerable number of operations for the cure of hernia, in Europe and America, at the present time being performed, still there can be little doubt but their number has been markedly diminished within the past two years; in other words, that a reaction, definite and pronounced, has set in against the utmost indiscriminate surgical interference, which was the rule with a larger number of operators in the recent past. This is attributable to the firm position which many occupied against a so general resort to sanguineous methods, for the permanent cure of an infirmity, which in general may be cured or borne by prothetic measures, and which is not very often attended with danger to life. Besides, as time passed, the number of relapses in those cases which had been reported cured, were becoming very numerous. And with not a few of them, the recurrent rupture, which had tumbled through a recently closed hernial out-

let, had become more unmanageable and of greater volume than the original. In not a few, when a hernia of considerable size had been returned and confined on one side, another appeared on the sound side.

With some, the scar-tissue along the canal had caused so much pressure on the efferent vessels of the testis, as to induce a painful varicosity of them, or atrophy of the gland. In three of my own cases, in which there had been no return of the hernia, the patients, all males, seemed to be haunted by an oppressive, unaccountable melancholia, a mental alienation, which I interpreted to arise from irritation of the spermatic filaments of the sympathetic and other nerve branches compressed in ligating the omentum or sac. The incompleteness or imperfection of the cure in many so-called successes was only too manifest by the subsequent necessity of wearing the truss, spica-bandage belt, or *ceinture*.

Again, after a time, as the structures which enter into a hernia were more critically studied, a better acquaintance with the ætiology of the infirmity was had, and it was seen that many of the radical operations demanded an extensive division or mutilation of important structures in their continuity, confidence was replaced by skepticism, and, in many cases, approval by condemnation.

Notwithstanding, however, the vicissitudes through which modern operations for the radical cure of hernia have passed, the impartial, progressive and experienced must admit that they occupy a legitimate position in surgery, and in proper cases, skillfully performed, serve an invaluable purpose.

But the cases which are suitable or justify intervention are comparatively few, as already stated.

For the purpose of being able to recognize those of the non-strangulated variety, which are appropriate for operation, it may be well to first describe those in which mild, tentative measures suffice to effect a cure; next those in which relapse is almost certain to follow, and lastly, those patients suffering from a species of hernia, the removal or reduction of which is attended with great danger to life.

We would not operate on the infant or growing child unless his hernia was ungovernable to truss-pressure, or was so painful

that no support could be borne, or unless he were a cryptorchid or were suffering from a hernia in the unclosed vaginal process. The tissues of the infant are tender and highly vascular. The structures are at this stage of life in but their formative stages of development. The infant has practically no inguinal canal, both apertures being directly opposed to each other until nearly the third year.

In large adult herniæ, particularly direct inguinal and every other type of the malady of long duration and of considerable volume, which causes extensive pathological changes at the rings, in the canals through which they pass, in the sacs within which they lodge, and lastly in the viscera, the mesentery, omentum or intestine, no sort of operation can, in many of such cases, be regarded other than a relief measure of doubtful propriety. Histological, interstitial changes have advanced; pressure, tension, strain and disturbance of nutrition have irretrievably altered the supportive girths of the lower abdomen. The mesentery has elongated or lost its tonicity, and the intestine itself has increased in length.

The valvular property of the canals is lost, and their obliquity has disappeared, nothing remaining but one large, common portal, through which the protrusion emerges directly. Those employed in occupations of a very laborious character are not a desirable class on which to undertake the radical cure. With them the hernia is almost certain to return in a short time in an aggravated form, so that unless there are special and pressing reasons, hernia with this class should be left to bandage-pressure or the truss. Radical cure as an elective measure should never, except for some special reason, be recommended in those whose occupations are sedentary, with those of abundant means and possessing every facility to secure expensive and perfected retentive apparatuses, unless they endanger life. Nor is it often a justifiable procedure in those very advanced in years.

Relapse is almost inevitable in musicians who play wind instruments, in public speakers, or those afflicted with asthma or chronic bronchitis, unless the broad belt is constantly worn.

Operations are dangerous in all cases of voluminous hernia, unless they have been reduced by taxis before operation is com-

mened on them. To this class particularly belong umbilical and large laparotomy herniæ.

The danger arises from the sudden return of large eventrations, which have, for a long time, been domiciled outside of the abdominal cavity, and have acquired their nutritive supply mainly from the vessels which ramify through tissues, among which the viscera have strayed.

When pulmonary anæsthetics must be employed, we should not overlook the dangers attending their administration in those laboring under organic disease.

CHAPTER XII.

THE RADICAL CURE IN STRANGULATED HERNIA.

There is no unanimity of opinion among surgeons on the question of combining measures for radical cure with the liberation of a strangulated hernia.

Those who oppose every sort of unnecessary manipulation when one proceeds to operate for this desperate condition, do so on the ground that as our patient is generally in a state of collapse we should compress the time for operation into the narrowest possible limits. No statistics are extant which might determine the validity of this allegation, as to whether the mortality is actually increased in operations for strangulation with radical cure combined. However, it is rational to assume when our patient is in a state of great prostration and shock, the more quickly we can relieve the stricture the greater would be his chances of recovery.

I have had one patient who was brought in for operation for strangulation die almost at once after he was placed in bed.

Another, a middle-aged woman, died under our eyes, on the table, before the house-surgeon could complete the division of the constriction. Three have died within an hour after they were returned to bed from the operating-room.

But there is a large number of cases of strangulations which come under our treatment comparatively early. Since it is becoming more generally known that early operations are safer, and the prospect of cure is held out by surgical intervention, this number is rapidly increasing.

Even in those cases presenting the most unfavorable symptoms, when we can dispense with pulmonary anæsthetics, we may proceed with more deliberation, and extend the period occupied by adding the necessary steps which favor a radical cure.

Since McBurney's operation was first devised, about three years ago, I have operated on twelve cases of strangulation, in every instance combining measures for radical cure, though not always employing the above-named method. The mortality in my hands has not been as high as it was previously, when nothing was attempted beyond reducing the strangulation.

COMPARATIVE MERITS OF OPERATIONS FOR NON-STRANGULATED AND REDUCIBLE HERNIA, BY MODERN METHODS.

It would be impossible for one to enumerate the almost infinite number of operations for the treatment of non-strangulated hernia, which have been devised and described during the past ten years. Every country has scores of them; America, probably taking the lead. But comparatively few of them have been approved of, or have been adopted by the profession, while many of those which were at first most eagerly accepted, and have been most extensively practiced, are becoming unpopular, and are found wanting in the qualities claimed for them.

Many were taken up because of their novelty and the manner in which those who first elaborated them claimed that they were almost never-failing successes. When reports commenced to come in, that they were found wanting in the hands of others, their authors, at times, resorted to Heaton's tactics, to the subterfuge, alleging that in those cases of failure they had not been properly performed.

Dr. William T. Bull, of New York, presented a brochure at the annual convention of the "American Surgical Association," in 1890, the most interesting and valuable that has been written by any one, in any country, on the subject of modern operations for non-strangulated hernia. But in his essay he went to such extreme lengths as to deny that any operation whatever could be relied on to cure reducible hernia.

He would regard no case as cured, which had not stood the test of three years. These he claimed were uncommon. He collected his elaborate data from widely separated sources, and indiscriminately analyzed all the most modern and popular operations, particularly condemning in unmeasured terms the so-called "open operations."

Commenting on the varied, simple and complex technique of different operators, and the results of the cases treated by himself, after different methods, he concluded that the safest and most useful in the greatest number of cases was that one which was easiest and simplest of performance.

This essay of Bull's has been followed by a reaction, for the views which he enunciated were something more than theoretical deductions, but were the outcome of a very large and extensive experience in the service of hospitals, which furnished him with an abundance of clinical material with which to support his conclusions. He raised a forensic question, too, inasmuch as he practically condemned as unjustifiable those operations which were being performed on painless, harmless herniæ. So that now surgeons in America are more circumspect, and employ more caution in selecting cases appropriate for sanguinary measures.

The objective point with all surgeons in all operations is fundamentally the same, *viz.*, the restoration and retention within the abdomen of escaped protrusions. This object is consummated only by removing the causes which lead to them, and restoring such a structural arrangement as will permit of normal physiological functions. The operation which will accomplish these purposes with the least danger to life, and the least mutilation of tissue, in the end, must survive and endure as the most acceptable. Surgeons are not in accord on the means by which this end may be best attained.

THE ESSENTIAL PRINCIPLES ON WHICH ALL OPERATIONS FOR RADICAL CURE OR SURGICAL TREATMENT OF REDUCIBLE, NON-STRANGULATED HERNIA ARE PERFORMED.

The fundamental, vital phenomenon indispensable to success, in the majority of hernial infirmities in adults, is local, adhesive inflammation, cell-proliferation, ultimately undergoing condensation, and fibrous sclerosis.

This phase of inflammatory hyperplasia is an active factor in the ætiology of hernia, but now it must be excited artificially, by the surgeon, in all direct operations for the relief or cure of it. In this particular, lime has brought no change in the therapy of hernia.

THE AGENTS BY WHICH INFLAMMATION HAS BEEN INDUCED TO CLOSE THE APERTURE.

These may be divided into chemical and physical. To the former belong subcutaneous injections of irritating liquids, the direct application to the tissues of caustic solutions, or actual cautery. As for mechanical agents their name is legion. Among them we may enumerate direct and indirect pressure; the seton, the suture or ligature, animal, vegetable or metallic.

The mechanical technique of operation has undergone but trivial changes for centuries. The peritoneal investment or the sac has not yet been definitely dealt with in anything like accord among operators. Some leave it undisturbed, except at its neck, which they ligate. Some twist it, others reel it up and clamp it in the passage; others inflate it with a rubber bag. By some, it is caught up and woven into the divided rings. It is pulled down and pushed up. Finally, others have no use for it, and cut it off inside the inner ring.

Many have aimed to obliterate the inguinal canal, and at the same time preserve it, paradoxically as it may seem, for the passage of blood-vessels and other tubular structures. Efforts have been made to permanently approximate the tendinous pillars of the inguinal and crural outlets, and effect their union by the employment of sutures, or by plastic inflammation.

Many cut directly down on the breach, turning back the investing tunics, layer by layer, until the sac is exposed or opened.

When the toilet of the sac is completed and the apertures dealt with, they are again homologously replaced, sewn together, and covered in by what is known as the *buried suture*. Others, on the contrary, deliberately prevent primary union, and stuff the gaping wound with some irritating fabric which induces abundant cell proliferation, granulations, and adventitious tissue.

The same diverging lines are pursued with the crural canal. The aim of many operators is to carefully preserve or restore it, while our latest completely destroy it.

Diverse and manifold as are the methods by which reducible hernia has been and is treated surgically, the keystone of the arch of success is the utilization of a plastic solder, or cement substance, the product of inflammation, which is designated scar or cicatricial tissue.

The results of such operations, in a very large measure, depend on the perfection or permanence of the cicatricial welding of the divided parts together. Do such structures as the integument, the aponeuroses, muscle, tendon, or serous membrane ever regain their pristine retentive strength and elasticity after complete division and subsequent reunion by cicatricial tissues? And if they do in a measurable degree, which is the most durable and firm, that which succeeds prompt, primary union, or that which is yielded by granulation tissue?

If the first question can be answered in the affirmative, then, indeed, the range of hernial operations for radical cure is a wide one.

On the contrary, if the opposite obtains, then such operations must be confined within very restricted limits.

If granulation tissue is firmer and more unyielding than that which succeeds primary union, then the open treatment, with a suppurative sore, should be encouraged in every operation for the cure of hernia.

CHAPTER XIII.

THE MECHANISM OF HERNIA FROM A STANDPOINT OF STRUCTURE, FUNCTION AND ABNORMAL CONDITIONS.

However desirable it may be, yet it is quite impossible in a treatise which deals with the practicability or the possibility of curing hernia, to avoid a brief reference to that deviation from normal anatomy and physiology in the apertures prone to this infirmity in the abdominal walls.

The inguinal-canal in the male is said to be caused by the descent of the testis, which occurs between the sixth and seventh month of utero-gestation. How it is formed in the female, the so-called canal of Nuck, is not capable of explanation. For here, surely, the generative glands do not leave the abdominal cavity.

The testis in its march outward pushes before it from within, the parietal peritoneum, or transversalis fascia, which becomes the *processus vaginalis*; some of the muscular fibers of the internal oblique, constituting the suspensory muscle of the testis, the cremaster; the aponeuritic fibers of the external oblique, from which

those dense felted fibers of the inter-columnar fascia are derived; the superficial fascia, or cellular membrane; and the integument.

Three arteries, several veins, nerves, and the vas deferens form the spermatic cord. These, as they emerge through the internal ring, are more or less bound together by fibro-cellular tissue very frequently, from the point at which the spermatic canal becomes obliterated above; and they are so adherent to the walls of their common, serous investment as to be separated only with difficulty. Frequently this is quite impossible without laceration.

The external or fibrous layer of the vaginal process is a thick, elastic sheath, which, unlike the inner peritoneal layer, is always, throughout life, an open sheath above; the interval between it and the serosa being loosely occupied by connective tissue. In form it is that of a double funnel, being widely expanded above at its origin and again below for the testis. Some anatomists designate it the infundibuliform fascia.

The inguinal canal is an oblique slit, which, including the rings in the male adult, is about three inches long. It commences internally about the middle of Poupart's ligament, or in the center of that line, which begins at the anterior superior spine of the ilium and the spine of the pubis. It occupies an oblique position from above downward; commencing in the fascia transversalis, as it advances forward and downward passing anterior to the internal oblique and transversalis, and posterior to the external oblique. The internal epigastric artery passes up between the peritoneum and fascia transversalis posteriorly, midway between the rings. The inguinal canal is always, in the normal state, completely filled by the elements of the cord or round ligament at its origin. This valvular vent is so adjusted that the greater the intra-abdominal or extra-abdominal pressure, the more completely is it closed. In this respect it is not altogether unlike the ureteral inlets to the bladder.

In the infant both rings are so apposed that there is practically no canal. In the adult the canal is funnel-shaped, being much narrower at its inner than at its outer opening, so that by invaginating the scrotum the tip of the index finger readily enters for two inches or more, until it is arrested at its inner terminus.

The external tendinous margins of its outlet are named pillars. Their anatomical elements consist of white fibrous tissue, and are hence quite destitute of blood-vessels. The normal state of the external ring is open, the viscera being amply walled back from protruding by the combined tendon of the oblique and transversalis muscles. The triangle of Hasselbach, in the normal state, renders development of certain descriptions of inguinal hernia quite impossible.

CONGENITAL DEFECTS OF DEVELOPMENT IN THE SPERMATIC CORD, THE INGUINAL CANAL AND OUTLETS, AND THOSE ARISING FROM PATHOLOGICAL CHANGES.

There is no region of the body in which nature so frequently fails in perfecting her processes of evolution as she does in that through which traverse the external parts of the male generative apparatus. Had the male generative glands been retained in the abdomen, as they are in some of the quadrupeds, man would have been spared much misery. Why it is that they have been lodged externally, is a mystery that our most astute physiologists have been powerless to solve.

In the chapters on hernia in children it has been noted that the complicating changes that invite hernia are mal-descent or non-descent of the testis and cystic disease of the cord (Fig. 10). We now come to deal with pathological conditions of the cord and its sheath, which have persisted without relief into adult life, or which, having been apparently cured in childhood, have relapsed in an aggravated form later in life.



FIG. 10. (*Filizet.*)
Congenital Hernia Before the Operation.

It has been seen that normally, after the testis is lodged, the open, serous tubular structure becomes obliterated from above downward. But it may remain open, so that the tunica vaginalis and the peritoneal space become one common cavity.

In this instance we will have a free passage for the omentum, or intestine, from within, outward into the scrotum. Hence, the intestine has no independent sac. In this class of hernia, the presence of a sac gives the operator no concern, for there is none. The *fascia propria* may close at the internal ring and remain open below, when the lower segment becomes distended by a serous accumulation; a hernia may come down, and while, though, there appears one common tumor, there are two independent sacs in this state.

A small omental mass may engage in the canal of the spermatic fascia, producing a genuine congenital hernia, while the peritoneum has given way to pressure at the inner ring, and another hernia is on its way in the same direction. Large hydroceles and voluminous spermatoceles, if unsupported in time, cause a great elongation of the cord and weakening at this internal portal.

The relative positions of the rings have an important bearing as an ætiological factor in the production of hernia; and as of late much is being done by surgeons to reproduce the displaced or dilated canal, it is well to endeavor to estimate to just what extent surgical manipulation or ingenuity may succeed in this direction. There can be little doubt but that with those strongly predisposed to inguinal hernia, and when the infantile type is perpetuated, one ring lies in almost immediate juxtaposition with the other, and there is and has been practically no inguinal canal at any time. If there ever has been a normal inguinal vault in the herniated, a large protrusion continually occupying it soon effaces every trace of it, and nothing remains but an immense, common orifice, a large open portal. Unhappily, with this derangement or destruction of the normal architecture in the inguinal region, though we may in many cases partly prevent it, we are, as a rule, powerless to wholly repair the damage resulting from it.

It is obvious, then, that in many cases it is absurd for operators to lay down any common rule for the technique of inguinal hernial operations, which will apply to all. For instance, to de-

scribe the management of the sac, when there is no such pouch present; to tell us how we must deal with the canal, when there is none, or how the *rings* should be encountered, when, in fact, there is but one.

Much has been written on the manner in which we must proceed in order to preserve the cord. But as there is neither cord nor testis in the cryptorchid, this it would seem should not embarrass us in those cases. It is said that in about one in a hundred the testis has not cleared the inguinal canal in the new-born male, and that in one in five hundred it never leaves the abdomen.* Hence, in every case of hernia in the male infant the testis should be sought for. If it engages in the inguinal canal, and fails to completely descend through the lower outlet, it is a constant source of hernia, as by its presence it keeps the passage widely opened and favors the descent of the viscera.

There can be scarcely a doubt but this irregularity of descent of the testicle is responsible for a very large proportion of inguinal hernia in the male.

Camper, in dissecting 17 infants under three months old, found the *fascia propria* or peritoneal investment of the cord, continuous with the general cavity, freely open on both sides in 11. It was open on the right side in 4, and on the left side in 2. Hence, in the 17 it was completely closed on both sides, at this age, in but one. There was no hernia.

*Curling, on the Testis, page 203.

CHAPTER XIV.

INGUINAL AND FEMORAL HERNIA IN THE FEMALE, WITH OBSERVATIONS ON MALE FEMORAL HERNIA.

The canal of Nuck, so called, which penetrates the musculo-aponeurotic planes of the lower abdomen of women, differs from the male inguinal canal in transmitting through it no large tubular structure, but rather a fibro-cellular impermeable cord, one of the supporting stays of the uterus, the round ligament. As Dr. W. C. Wile, of Connecticut, pointed out, in an extensive series of observations on apparent hernia in the inguinal region of the infant and adult female, that these protrusions consist very often, mainly, of cystic formations along the inner laminæ of the infundibulum. Cystic changes in all the elements of the female generative apparatus are very common, not even the non-vascular ligamentous structures escaping.

When those serous cysts undergo spontaneous absorption, during infancy or early childhood, no harm comes; but when they attain considerable size and persist into adult life, their presence weakens the inguinal walls and leads to hernia.

FEMORAL HERNIA IN THE MALE AND FEMALE; ITS MORBID ANATOMY
AND PECULIARITIES.

The pathological basis of femoral hernia is always, primarily, dependent on defect of development. Many theories have been advanced to explain the morbid anatomy and structural deviations in evolution, which are attended with visceral protrusion under the femoral arcade; yet, for the most part, they remain unsupported; hence our knowledge of them still rests largely on hypothesis.

In inguinal hernia in the male, the descent of the testis so clearly accounts for the breach in the abdominal walls, the canal, and rings, that the *modus operandi* of this hernia is at once comprehensible and obvious.

But with a hernia which insinuates itself on either side of or between the femoral blood-trunks, as they leave the pelvis, we can advance practically nothing as a causation. Nor is there, substantially, any good reason why femoral hernia should be more common with women than with men. The crural arch is composed of the same structural elements in both sexes, though it is broader in females.

As we study the physical conformation of the parts concerned, and note the extreme obliquity of the course through which a hernia must pass before it clears the saphenous opening in the fascia lata, we can appreciate the obstacle which this sharp curve must offer to an extrusion and circulation of the ingesta through a prolapsed coil of the intestine in this situation.

Normally, as the vessels leave the pelvis in this situation, and occupy the femoral sheath, they are so protected by reduplications of the parietal peritoneum, and are so firmly apposed and walled in by the cribriform fascia, that it is wholly impossible for any external substance to penetrate between their walls.



FIG. 11.
Femoral Hernia.

In many subjects, however, we will notice at the point where the vessels leave the cavity of the peritoneum, there is a layer of adipose tissue mingled with fibro-cellular elements, through which the vascular channels pass. This has been named by Cloquet the *Septum crurale*. Now, in not a few, we will discover a fringe of this fat, extending from the so-called septum along the inner surface of the common sheath to the saphenous opening. The caliber or diameter of the femoral canal depends on the presence and quantity of this substance, for without it there is no canal.

The deep layer of the superficial fascia, which is extended over the boundaries of the saphenous opening, sometimes designated the cribriform fascia, varies in thickness and density.

The saphenous opening in the fascia lata, like the external outlet of the inguinal canal, has diameters very much out of proportion to the tubular structures to which it gives passage.

Its superior and inferior borders, as well as its falciform process, the deep femoral fascia and the ligament of Gimbernat, are composed wholly of fibrous tissue.

It is seen, then, that the femoral sheath, which corresponds with the spermatic process, is a very much simpler organ in its construction, position, arrangement and relations than its prototype, which passes over the arcade immediately above it; for it has no independent muscular envelope, nor does it transmit the duct of any secreting organ, but the great blood-trunks which pass through it. After the crural sheath reaches the saphenous opening, it acquires such firm and intimate adhesions with the walls of the vessels which it encloses, as to completely obliterate that interspace, which, when caused by disease or artificially produced, is known as the femoral canal. Accordingly, when any extraneous substance enters the canal from above, it is arrested at the entrance of the saphenous tributary, and here it must remain; or else in time make its way through the saphenous opening, carrying before it its mural support, the cribriform fascia and deep femoral, in which latter event we will have a complete femoral, and with the former an incomplete femoral, hernia.

The numerous large absorbent glands which encircle the saphenous vein between the two layers of the superficial fascia, and are often found imbedded along the plane of the blood trunks

between the septum crurale and the cribriform fascia, are normally so adjusted as to give solidity and support to the walls of the femoral canal.

In cases of lymphadenitis, which extends to the deep chain of the groin, the free plastic exudate, which is thrown out over the surface of the glands capsules, often causes such an extensive extravasate, that when it is not completely absorbed, then its residue undergoes fibrous condensation and firmly welds all the tissues in the vicinity of the inflammatory changes into one mass, more particularly the envelope of the glands to the outer walls of the vessels.

The position as well as the diameters of the saphenous opening varies, for it will be observed that it was many years ago pointed out by Bichât, that this portal in a large number of subjects did not always correspond in diameters or size in proportion with those of the subject. This same famous anatomist also noticed its varying obliquity and position.

In women it will be found placed further inward, with less obliquity in position and of greater dimensions than in men. It is clearly evident, accordingly, that femoral hernia is wanting in that complexity of construction so characteristic of the inguinal variety. Hence, we will not expect to encounter those complicating pathological conditions so often here as we do in kelotomies, performed over Poupart's ligament. Yet they are sufficiently numerous to demand of us a familiarity with them before an operation is undertaken for their relief or cure.

It is well to remember that we may have a femoral and inguinal hernia on the same side.

The structural changes in the component parts of the femoral canal, necessary to make the advent of a hernia possible, involve,



FIG. 12.
Femoro Inguinal Region.

first, the apertures; secondly, the lumen of the femoral sheath, and thirdly, the contents of the canal itself. It is self-evident that with the canal hermetically sealed, nothing can possibly escape. But when it is remembered, that even under normally physiological conditions, the volume of what enters and leaves the canal is constantly changing, its diameters must likewise change, so that while they are under these conditions closed, they are not, so to speak, always filled completely.

Second, the varying capacity of the femoral sheath. There can be no doubt but the diameters of the femoral artery are quite constant. The column of blood in this vessel is subject even in health to many influences, which modify its volume and movement. The most constant influence perhaps is gravity; the next is ever-changing capacity of the peritoneal cavity, particularly in married women.

Pathologically, any impediment in the inferior cava, by tumors or enlargement of organs along its course, disease of its valves, or in its own walls, leads to a dilatation and weakening of the

femoral vein.

The fringe of adipose tissue, which in health fills the interspace between the wall of the sheath and the vein, may undergo a sudden hypertrophy, and cause a widening of the canal; so that in

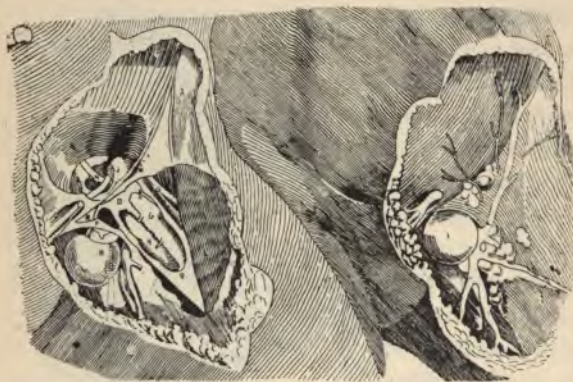


FIG. 13.

the event of it taking on atrophic changes, it leads to a widening of the canal, and a descent of the viscera.

The third, that which has reference to the contents of the femoral sheath independent of the vessels, is probably the most proximate and direct of all exciting agencies, as a causative of hernia.

In the greater part of diminutive, incipient femoral herniæ, we will discover on division of the tissues, and on exposure of the

canal, that the extrusions consist of omental tissue; that they are epiploceles.

Through some fault of evolution during the formative stages of development in early foetal life, in some inexplicable manner a portion of omental tissue makes its way into the femoral sheath, after which it may remain at the inlet, descend further down, or pass directly through beneath the falciform process. It may be assumed that it often undergoes degenerative changes, or atrophies, and disappears. This is the only hypothesis on which we can account for the frequency of epiplocele in femoral hernia. Normally, the omentum is above the horizontal plane of the internal femoral opening, so that the *double* peritoneal sac, which we may occasionally meet with in inguinal hernia, is seldom seen here.

It is true that there are, at times, in cases of acute strangulation of a femoral hernia, no evidences of anything in the sac except a pinched knuckle of intestine; still, upon releasing the imprisoned bowel, we will rarely fail to find along the track either free or adherent omental tissue of a varying volume, contour, or consistence. When this is firmly adherent to the walls of the canal, or is restrained by a short, inelastic pedicle, it securely blocks the passage against intestinal transit. But when, if it be loosely movable, and has, by its wedge-like action, widely spread apart the walls of the canal, then under a diversity of circumstances the free intestine, in close proximity, may slip down through, advancing onward beyond the situation at which the adipose mass itself is lodged. In chronic old femoral, many of the landmarks of the surgical anatomist are practically lost. It is very often quite impossible to diagnosticate an incarcerated inguinal from an old femoral hernia. This is particularly true of the female, whose integuments are often under-padded by a very thick layer of fat. And in many cases of large, impacted, chronic femoral epiploceles, it is quite impossible to recognize them from enlarged lymphatic glands.

CHAPTER XV.

MORBID ANATOMY AND PATHOLOGY OF EXOMPHOCELES, EPIGASTRIC HERNIA, EVENTRATIONS, OR LAPAROTOMY HERNIA.

Umbilical hernia in the adult is seldom seen, except in infants and child-bearing women. It is well to have a clear comprehension of its gross constituent elements, if we would the better appreciate what may be accomplished by surgical measures in serious cases of this infirmity.

While hernia in this situation in the male is rare, it is not entirely wanting; though it is with them usually of a small size, and is entitled to the designation only because it is in close proximity to the navel scar, for of its essential elements it contains none, and is outside of the umbilical aperture in many.

With women it is attributable either to a rupture, or an elongation of the circular fibers which close in on the urachus and the round ligament of the liver at the umbilicus. In many the fusion of the muscle, aponeurosis and peritoneum are so firmly blended together at the annular aperture here, that the protrusion can advance in but one direction, and that is against the thin, wrinkled,

integumental covering of the navel. It is marvelous how this can spread and expand, so as to reach a size as big as the fist, or even larger, when its coverings may become as thin as tissue paper. The contents of an umbilical hernia are omental or intestinal, or both. The reducible are usually enteroceles. Epiploceles are the most common in this situation in adult life, and are irreducible. The mechanism of a hernia here is altogether unlike that which occurs above and below the ligament of Fallopius.

In the latter situation we have canals and rings, through which tubular structures pass, which have a peritoneal investment. In the umbilicus none of these are practically present. Here we have simply a weak spot in the upper abdomen, dependent on defective development and other causes. As there is no obliquity to the passage of emergence, and no bony supports, it is obvious that unless the opening, through which a hernia passes, is well buttressed by powerful ligamentous or aponeurotic tissues, rapid eventration must often follow. In this situation, theoretically at least, one would suppose that a radically curative operation would offer the best prospects of success; as there is no impediment in the way of completely and solidly closing in the hernial vent. Strangulation is not very frequent in umbilical hernia, though these herniæ are commonly painful and are always sensitive, owing to their attenuated, integumental covering; besides, they are quite prone to peripheral inflammation, ulceration and hemorrhage, when their contents are omental. In aggravated cases, the protrusion by causing a constant, well-sustained strain on the umbilical opening, in time so stretches or lacerates its borders that they give way, and any parts of or all the abdominal viscera except the fixed organs, may pass directly out of the abdominal cavity into this adventitious pouch. If we exclude the omental investment, it cannot be said that hernia of any description in the upper abdomen has an independent peritoneal covering. In this situation, also, we perceive that pathological condition which may be designated, *rupture*.

As soon as the viscera leave the abdominal cavity *en masse*, they by their presence excite irritation in the layers of the cellular membrane, subcutaneous tissues, or intermuscular spaces. This in turn causes an inflammatory plastic exudate, which binds the

wandering organs to the parts into which they have trespassed. As a consequence of this new alliance, the source of their nutritive supply is changed, and hence, instead of the intestine being wholly provided by the vessels which course through the mesentery, it draws freely from the vascular supply of the cellular membrane of its new domicile.

Those hernial protrusions of the greatest volume, however, which issue through at the umbilicus, most frequently make their escape by a breach in the abdominal wall itself; although, as they emerge, they so press the tegumentary coverings of the navel forward as to mask their real origin.

Epigastric herniæ, or those which are located anywhere between the umbilicus and the tip of the ensiform cartilage, are most often encountered in the male sex. They may be so small as to quite escape detection, unless they become inflamed, or threaten strangulation. They are wholly of a congenital origin. In some manner, not understood, a small nodule of adipose tissue directly connected with the omentum makes its way through the median line, imbeds itself with an adventitious sheath of cellular tissue, with which it forms adhesions. I met with such a case last winter, in a man fifty-six years old. For a short time he had symptoms of strangulation. There was vomiting, colicky pains and constipation. As he declined operation, by the hypodermic employment of morphine, warm applications and rest, the symptoms passed away. Over the tumor the tissues were swollen and exquisitely sensitive. He had it as long as he could remember, and though he was all his life engaged in a laborious employment it had never given him the slightest inconvenience before.

Eventration or laparotomy hernia is essentially a traumatic infirmity. Since laparotomy is becoming so generally practiced in America by surgeons, particularly for treatment of diseases of the internal generative organs of the female, and for pathological conditions of the cæcum and its appendix, these herniæ are becoming common sequelæ of those operations.

There can be no question of doubt about it, but a free incision into the abdominal wall or the peritoneal cavity is invariably followed by a weak bond, at any time liable to stretch or rupture.

It has been claimed that when the incision is made through the muscular planes, instead of the aponeurotic tissues, the chances of hernia following union of the parts is considerably diminished. This has not been my experience, for the most intractable that I have met with were of the muscular variety, as has been stated.

The morbid anatomy of a laparotomy hernia is very simple. There is a giving way or sundering of the parts the more deeply lodged, a gaping of the edges of the peritoneum, and an eventration through the gap into the parts offering the least resistance. The pathological changes resulting are what make many of them the most serious species of the infirmity that we have to deal with in the whole category of hernia. As the intestine leaves the peritoneal cavity it produces a considerable elongation of the mesentery; besides, by pressure and strain, it interferes with the mesenteric circulation and impedes peristalsis. As a consequence the general health suffers. The appetite fails and constipation follows. Along with this the necessary *point d'appui* in defecation is wanting, in consequence of the breach in the abdominal walls and defective muscular action. The eventrated parts become adherent to the tissues in which they are lodged, which renders them irreducible, and, when exposed in operation, difficult to separate and free without danger of damage to the viscera and considerable loss of blood. It is readily apparent when observing the broken irregular scar consequent on many laparotomies, that a hernia must follow if the parts are not braced constantly. (See Fig. 14.)



FIG. 14.
Three weeks after a Laparotomy for large
Uterine Fibroid.

CHAPTER XVI.

LUMBAR, OBTURATOR, PERINEAL, PUDENDAL AND ISCHIATIC HERNIA.

Besides the above, there are many other phases of structural defects or pathological changes which lead to those conditions which are designated as hernia. They are those which are wholly internal, as diaphragmatic, and those which involve Meckel's diverticulum, besides internal and external types, which belong to the province of gynæcological surgery, such as prolapse of the bladder, the ovary, uterus, broad ligament, fallopian tubes, or the intestine into the vaginal outlet; or those cases of prolapse of the rectum through the anal sphincter, with or without strangulation.

But, with the exception of those which involve the female generative organs and the terminus of the rectum, these others of an internal order are so rare that many surgeons of large experience have never seen them.

Hence, this epitomized review of those protrusions which are limited to the abdominal cavity, with a brief consideration of their elementary constituents, with morbid anatomy of lumbar, obturator and perineal, pudendal and ischiatic hernia, will close this division of our subject.

LUMBAR HERNIA.

This is a pathological rarity. Sir Astley Cooper says he saw but one case. Lawrence does not mention it. The most complete and valuable contribution which we have on the subject is from the pen of Dr. Claudius Mastin, of Mobile, Alabama, to whom I am deeply indebted for his notes on this infirmity.

In his brochure presented at the annual meeting of the American Surgical Association in 1890, he was able to report thirty-three cases of lumbar hernia which he had gathered from widely separated sources.

But three were from American literature. Seventeen occurred in females and sixteen in males. Four followed accidents; two from spinal caries, one from old age, eleven came from injuries, three were congenital.

Although Petit's triangle would seem to favor hernia, yet, as the obliquus internus and the latissimus dorsi so closely overlap on either side, and the lower convex surface of the kidney covers it in, its weakness is more apparent than real.

The primitive causation is said by all authors to be congenital defect of development.

Of course, in traumatic cases following punctured wounds, we have a direct, unequivocal factor in their ætiology. Some of those recorded by Dr. Mastin were of this character.

Of the latter, I have had one under my care in the Ninety-ninth Street Hospital, of New York, in 1886.

The patient, a young man of 20, was stabbed in different parts of the body; though but one incision penetrated the abdominal cavity. This one apparently transfixed Petit's triangle. When the patient entered the hospital he had lost much blood through the wounds; and, besides, had hæmaturia. He made a good recovery, though a small hernia appeared at the site of the lumbar wound. After he left the hospital I lost sight of him.

History of Dr. Mastin's Case.—Dr. Mastin's patient was a boy seven years old, who had a lumbar hernia, which measured nine and one-half inches in its long axis and nine inches in its transverse diameter. He had also had a direct inguinal hernia on the same side (the left). It was partly reducible, and contained intestine. It was comfortably controlled by a truss. In this case

it was apparent that there was a loss of substance in the obliquus and the latissimus dorsi muscles.

This phase of hernia, like others of an unusual development, derives its greatest interest from a diagnostic standpoint, as enlargements here may often defy detection, and one may often be in doubt as to whether he has a neoplasm, hæmatoma, or hernia to deal with.

Second Illustrative case.—My patient, a derrick-man, was accidentally, violently struck by the fly beam of a derrick, just over the right hip, on the inner side.

He was able to rise and go home unassisted. A few days after, he came to me, when I found a large spherical mass on the inner side of the quadratus lumborum muscle, on left side.

I was at first in doubt as to its real nature. It seemed more like a traumatic hernia than anything else. It appeared to be slightly reducible and had a doughy feel. But there were no constitutional symptoms. Passing in an exploratory needle it was found to contain a limpid serous accumulation, which I finally aspirated, and it did not refill.

LUMBAR HERNIA IN FEMALE WITH CONTENTS OF SAC UNDERGOING MALIGNANT CHANGES.

Dr. James Moran, of New York, sent a case into my service, at Harlem Hospital, in January, 1891, for operation, of this description.

The patient was a married woman of 45 years of age. She had a fullness in the right lumbar region as big as her fists.

She said that it had been there for several years, but that it never gave her any trouble until six months previously, when it became harder, painful, and was increasing rapidly in volume.

After carefully examining her I concluded to make an exploratory incision, and act according to what it revealed. Making a long, free sweep of the scalpel, in an oblique direction from above downward, over the convexity of the fullness, I divided the integuments, and at once came down on a thick inelastic capsule, which had fused distinctly with the superficial fascia and the lumbar aponeurosis. After a difficult and tedious decortication it was freed, until the broad aperture it had made through the fibers

of the oblique muscles was reached, Here the detachable parts were dissected away, after which a double row of sutures trans-fixed its sessile pedicle. As it was traced into the cavity, it was found to be continuous with the omentum.

Now a drainage tube was inserted, and the parts closed, layer by layer, as in the radical cure of ventral hernia. Her recovery was uneventful. Since she left the hospital there has been no hernial return. Her former colicky pains have never annoyed her since, and the troublesome constipation of the bowels has given way to regular painless stools.

Although this case was not one on which an operation was deliberately undertaken with any definite end in view, yet I can find no other cases on record of the same character, which had been operated on for the radical cure; and as these herniæ only in the rare event of strangulation or neoplastic changes ever demand radical measures, we can understand why operations on them are almost never required.

THYROIDEAN OR OBTURATOR HERNIA.

Comparatively little was known of this hernia until the remarkable memoir of Garangéot was presented to the French Academy, in the early part of the present century.

A considerable opening is left in the uppermost segment of the thyroid-foramen for the passage of a nerve, artery and vein. Sometimes this space is incompletely filled, so that the omentum or intestine may crowd the peritoneum through it and produce a hernia.

The following account is given by the author of a case which he saw *post-mortem*.* "I found," he says, "on dissecting a woman, in her pelvis two portions of intestine, which had forced the peritoneum through the superior part of the femoral foramin, and had each formed a tumor about the size of an egg between the anterior head of the triceps muscle, and, as these tumors were not sufficiently advanced to produce a projection of the subcutaneous fat, by which they were thickly covered, no tumor could be perceived from without." Among many other highly interesting cases, the same author mentions one of a woman who, after a fall,

* Garangéot.

felt an extremely violent pain at the upper part of the right thigh, over the course of the obturator nerve, near the labium pudendi, which lasted three days, before he saw her. Garangéot discovered a hard, flat, painful tumor on the inner side of the thigh, about six inches in diameter. Raising the body and the knees, and gently but firmly rubbing the surface of it, it soon returned to the abdominal cavity with a distinct gurgling sound. The woman's nausea, colic, and retching, at once, ceased, and, within half an hour she had a free alvine discharge.

Cooper said that up to his time no operation had ever been performed for strangulation of this variety of hernia.

Malaval reported the case of Arnaud of a reducible, obturator hernia. On account of the situation of the artery, in operating, the incision of the stricture must always take an inward and upward direction.

In "Ashhurst's System of Surgery" we learn that Hilton unsuccessfully opened the abdomen in search of an internal strangulation, and found a knuckle of the intestine in the obturator foramen. His patient, who lost his life, had had pain along the course of the obturator nerve, but this important symptom had unfortunately been overlooked.

M. Oubr  had made an exploratory incision down on the saphenous opening, over a mass which was lodged under the adductor portion of the fascia lata. On dividing the fascia the pectineus muscle came into view, and under this a peritoneal sac, as large as a hen's egg, was seen. This was opened, when a loop of the small intestine was exposed. The strangulated edge of the obturator was divided, and the intestine returned. In the course of the operation the saphenous vein was opened, but was readily ligated. The patient made a good recovery.

Roesel attaches much importance to the value of rectal exploration as an accessory aid in these herni .

Dr. John Chiene, of Edinburgh (*Ed. Med. Journ.*, Jan., 1887), reports a discovery on dissection of a double obturator hernia in a female. In the sac of one was small intestine and in the other the ovary and fallopian tube.

Of late years many operations have been reported for this hernia, though the mortality has been high.

PERINEAL HERNIA.

This hernia presents about the same frequency in both sexes.

In men it descends between the bladder and rectum, and in women between the rectum and vagina. It usually advances as far as the integument, though seldom sufficiently to cause a bulging of the perineum and a visible tumor. Commonly, its existence can be made out in the male only by an examination through the rectum, and in the female through the vagina.

Mr. Bromfield (*Chirurg. Observ.*, page 264, 1857) cites quite a unique experience in a lad of seven years, on whom he was cutting for stone. "I divided the perineum," he says, "and was about to enter the bladder, when a thin, diaphanous membrane made its appearance. The lad gave a scream when it broke, and a quantity of clear fluid escaped. After another scream the small intestine came down, through." He replaced the intestine, removed the calculus, closed in the parts, and the boy made good recovery; no subsequent hernia following.

In Astley Cooper's work, an interesting case is reported from the practice of John Limme, of Manchester.

History of Case.—Patient was a lady who, though married several years, never had a child. She complained of vesical tenesmus, difficult defecation, and occasional nausea, and came to this surgeon for an examination. He found a large swelling at the posterior part of the vagina, which compressed the os uteri laterally. By firm and steady pressure he was able to return it completely. She soon after conceived and suffered no more from her former infirmity.

Dr. Smellie, in his work on Midwifery, cited the case of a woman who, five weeks before she fell in labor, had a tumor of this description, which previously she could reduce herself, but now it was of increased size and very painful. He found her in great agony. The tumor was livid, with fiery, painful edges.

She was lying on her back when he saw her. Now he directed her to turn on her side. As she did the tumor broke in the middle, when it gave issue to more than a pint of bloody ichor. She now exclaimed that the rupture had gone up, and her relief was great. Later he delivered her. Her rupture returned, though she was always, thereafter, able to reduce it herself.

PUDENDAL-HERNIA.

This hernia, as its name implies, is seen only in women. I believe it is not uncommon in the child-bearing woman; although as it almost never gives rise to serious inconvenience, it escapes notice. It must be remembered that hernia here, may become strangulated, nevertheless. It is usually situated in the inferior segment of the labium majus. Its cause is similar to that of perineal hernia, except that instead of passing by the vaginal wall it penetrates and passes through it. Like the latter, too, it descends in the erect posture, and ascends on the dorsal decubitus. Cooper reports one such case, which he successfully reduced by taxis.

REPORT OF CASE SIMULATING PUDENDAL HERNIA.

This case I was called in consultation to see by Drs. Rassman, and George E. Hubbard, of this city, in the winter of 1888. The patient, a young woman, while hanging a picture, slipped from the chair on which she had been standing, in such a way that when she fell her crotch came astride the sharp back of the chair. A very large, extremely painful tumor immediately appeared in the right labium, which it was thought might be hernia requiring reduction or operation. This opinion was all the more rational, because of the situation of the fullness, its impulsion on coughing, and the fact that it could be partly reduced by taxis. On examination, I found no constitutional symptoms pointing to hernia; besides, by examination through the rectum and vagina, I definitely ascertained its true character. It was a large hæmatoma, which disappeared in a few days.

CASE 2.—PUDENDAL HERNIA, RIGHT SIDE.

Patient, young woman, leading a "fast life," brought to me by her uncle (?). She had a large mass, nearly as big as a goose-egg, in the right labium, so that it now interfered with intercourse, which made it painful. It had been examined by others and pronounced a fatty tumor. But her history, the manner in which it came and disappeared, and a rectal examination, assured me that it was a hernia.

There was a most pronounced impulse on coughing, and the straining of defecation always increased its volume. By laying

her on her back, with the shoulders depressed, and the hips raised, it could be almost entirely reduced. I advised her to keep this position in bed for a week. In the meantime, applied a compress against the pubic ramus, and kept the bowels well opened. It completely disappeared, and four years after treatment I saw her, and there had been no return.

ISCHIATIC-HERNIA.

This is the rarest of all those herniæ protruding through the lower pelvic outlet.

Cooper reports one, having occurred in the practice of Dr. James D. Jones, of the Barbadoes, and one of his own.

History of Cooper's case.—Patient was twenty-seven years old, with all the symptoms of internal strangulation. Purgatives, clysters and emetics were given in vain. Cooper questioned his patient closely to elicit whether he had hernia. He denied that he had any. This eminent surgeon, embarrassed and perplexed, demanded an examination, which was granted, but nothing could be discovered. Patient was ill from the 18th to the 25th of June. On the 24th he felt much better, and on the morning of the 25th got up. In the evening all his symptoms relapsed, and he sank before morning. It was only on dissection *post-mortem*, that Cooper discovered the seat of the trouble, in a strangulated coil of the intestine, lodged in the ischiatic notch.

A FEW GENERAL OBSERVATIONS ON THOSE UNUSUAL VARIETIES OF HERNIA HERE ENUMERATED.

It is not customary in all treatises of this description to enumerate those of so rare a type as these here cited, as some of them have been omitted, in every work on hernia and general surgery that I have been able to peruse, both by the older and more modern writers.

Nevertheless, I am convinced that they constitute a very important class, not of a kind perhaps, which may be radically treated by surgical means, but are those, which, undiscovered, may lead us to assume that in a given case the obstruction originates from within, when the real seat of strangulation is external, to the peritoneal cavity; hence more readily and safely ap-

proached by relief measures. They all have many characters in common.

1st. They are more common in the female sex.

2d. When they do exist, being so deeply lodged in such unusual situations, unless a special and most thorough examination is instituted, through the absence of a distinct prominence, they may be overlooked.

3d. They seldom lead to strangulation.

4th. When they are painful, are increasing in size, threaten obstruction, and cannot be controlled by a truss, they should be operated on.

In all cases of sudden obstruction of the bowels, before the question of a median-laparotomy is for a moment entertained, all the hernial-apertures should be rigidly scrutinized. It is not enough that we question our patient; we must feel, with our own hands and see with our own eyes that all the portals of escape from every district of the abdomen are free and unimpeded. If one is in doubt, then, though the practitioner may imagine that a consultation may detract from his merit and imply that he is not competent to cope alone, with the case, yet he owes it, not only to his own conscience, but to the poor, helpless sufferer who has committed his life into his hands, to leave nothing undone which might unmask the possible concealed seat of the malady and open the way to its safe and prompt relief. It is hardly necessary to add, that the only way to properly and thoroughly examine for hernia is on a table, with the trunk well exposed in a bright, clear light. Much may be learned in these rare cases, by a cautious examination through the rectum and vagina.

PART IV.

CHAPTER XVII.

MODERN OPERATIONS FOR NON-STRANGULATED HERNIA, REDUCIBLE AND IRREDUCIBLE.

Since the advent of the antiseptic epoch, a large number of operations of diverse technique have been devised ; in most cases those who devised and practiced them, claiming excellent results and few failures when they commenced to practice them.

In many important respects they were all alike.

The mortality attending their performance was almost nil.

In inguinal hernia the aim sought for, was to obliterate the hernial canal, without compromising the elements of the cord. As this was commonly known among operators, very many cases came under the scalpel for treatment, which would not have done so had there been much risk to life attendant on interference. Larger open incisions were now the rule, and subcutaneous invaginations were wholly cast aside.

In order that each step in operation should be fully carried out,

it was necessary that the parts be laid widely open. Without this, it would be quite impossible to lay bare the rings, isolate an adherent sac, or manipulate the cord.

In cases of complete inguinal hernia in the male, it is interesting to note the diverse manner in which the sac is treated.

The majority of operators regarding its presence as a menace to permanent cure, as always being an extraneous substance, cut it away on a line with the parietal peritoneum. Others permitted it to remain, after its division, on a plane with the internal ring. Again, some allowed it to remain intact, but with one or two rows of sutures run through its walls, from the base to the utmost summit, undertook to radically efface its lumen. The operation of utilizing the entire sac and fixing it as a pad in the hernial aperture was again revived.

The rings too have been treated in diverse ways. Many regard an operation for radical cure incomplete without solidly suturing the pillars of the external ring, while others freely divide it in opening the canal to the inner ring, as in the *open* operation introduced by Dr. Charles McBurney, of New York, and others, who make it a *sine qua non* that the pedicle of the sac be extirpated at the internal ring. As has been noticed, the rings have been cleared of the sac in some cases, while others have attempted to plug them with the displaced sac. For the latter purpose, also, in epiploceles, a portion of the omentum has been anchored in the canals and fixed with sutures. One of the most modern operations, that of Bassini, of Italy, contemplates the entire destruction of the inguinal canal, by free division of the rings, the spermatic cord being lifted out, and made to pass through another opening made for it.

It has been recommended by Lawson Tait, that when an operation is undertaken for the removal of an abdominal tumor, any hernia present should be dealt with from within, drawing the protrusion upward, and closing the canal with sutures passed through the peritoneum. Indeed, he even suggested this internal route for the treatment of strangulated hernia (*British Med. Asso.*, 1891). Many have regarded the presence of the spermatic cord as an insurmountable barrier to radical cure, inasmuch as its presence prevented the total obliteration of the inguinal canal.

But when one carefully studies all the aetiological factors of an inguinal hernia, this must be denied. Besides, we are informed that in those times when indiscriminate castration was permitted, a considerable number relapsed.

The same general principles are applied to the treatment of femoral hernia as in inguinal, except of course such as apply to the management of the tubular structures. Though in our operations on the inguinal canal we may by a wound or by cicatricial pressure, weaken the functional vitality, or cause atrophy of the testis, its fellow being preserved, virility remains, while the same damage to the contents of the femoral canal might entail the loss of a limb. Hence, here any solid plugging of the canal, its firm approximation with sutures, or entire obliteration is quite out of the question. Its anatomical and physiological properties reduce within very narrow limits, our efforts to radically deal with hernia in this situation. In uncomplicated, adult umbilical hernia, on the contrary, there is practically nothing in the way of our endeavors to hermetically obliterate the vent; for, normally, there is nothing here that can, under any circumstances, be regarded as a canal, the patency of which must be maintained.

COMPLICATING ELEMENTS IN HERNIAL OPERATIONS.

Before entering into the consideration of operation of selection in cases which present various anatomico-pathological elements, it may be appropriate to first consider the impediments which often nullify our best efforts, or at all events prevent satisfactory results.

It must generally be conceded that we are yet without the ideal suture material.

Aseptic, absorbable suture is so liable to slip, tear, or melt away before firm or solid union is effected, as to be unreliable for general purposes. Using heavy, chromicized strands will not help us, for their introduction into the tissues entails a vast amount of tearing, and, after being lodged, if not disposed of by absorption, they are sure to be a source of irritation. With a ligature on the stub of a divided neck of the sac, should absorption occur before permanent fusion of the overstretched serosa, as this glides back into place an enormous breach in the peritoneal wall is certain to

occur, and the most ungovernable description of relapsing hernia is sure to follow.

To secure large vessels in the omentum with cat-gut is to needlessly imperil our patient's life. This material, while often serviceable in peripheral hemorrhage, is not the safest in the surgery of serous cavities.

If the soft parts, the muscles, ligaments, or aponeuroses in the abdominal walls, would tolerate foreign substances with the same impunity that the gums do mineral or metallic in dental surgery, then indeed we might proclaim to the world that practically all herniæ were safely, rapidly, and radically curable.

But there is the rub. They will not. True, some of the tissues, particularly the sero-cellular, often possess a singular tolerance to insoluble materials, but the muscular structures, bones, and ligaments promptly resent their intrusion.

What would be simpler than the free division of the perihernial structures, return or excision of the viscera, shutting off the general peritoneum with a strong silk-knot, solidly closing in the canal and rings with the same material, and burying all under the surface-suture?

But this substance, by mechanical irritation, so often gives rise to ulceration when imbedded in the subcutaneous tissues, that it makes its way to the surface, or is a source of painful swelling. When this is not a sequence of the employment of the subcutaneous silk suture it often cuts its way through the tense edges which it approximates.

The French surgeons have attempted to overcome the difficulty in using silver and gold, the "*suture d'or*" and "*suture d'argent*," but with the same result. Furthermore, as will be noticed later, there are anatomical reasons why, unless permanent tolerance can be secured to an insoluble suture, the absorbable of any species whatever can serve nothing more than a very transient purpose, when utilized to obliterate a hernial hiatus.

In our time, when anæsthetics afford us ample leisure, and inventive genius has placed within our reach perfected mechanical implements, a dangerous hemorrhage is not a common accident in hernial operations.

Nevertheless, in those operations in which an adherent sac is

dissected, a considerable loss of blood by parenchymatous oozing is unavoidable. In detaching an extruded mass of omentum in a crural hernia I have accidentally opened the femoral vein, but moderate pressure controlled it, and it gave us no trouble during the healing of the wound.

During the performance of a hernial operation for radical cure by Bassini's method, in Rome, I have seen the internal epigastric artery cut across. For an instant there was an enormous jet of blood, but the cool and skilful operator (Dr. Bastianelli) quickly seized the mouths of the vessel and promptly secured them.

Owing to the manner in which the sac is often intimately blended with the cord, in its separation the spermatic artery has been torn; or one may, without the exercise of great caution, divide it for an adventitious band. As this vessel, when freed from the testis, is marvelously elastic, in a second after division its mouth may be drawn up beyond the internal ring, and permit of a very dangerous bleeding before it can be secured.

As the presence of free hemorrhage constitutes one of the most formidable dangers in all hernial operations, ample provision should be always made for effective hæmostasis in every instance, before they are undertaken.

Next to hemorrhage in importance, in herniotomies, is inflammation, mechanical and septic. It is absurd to assume that by any sort of chemical solutions, or exclusion of infecting elements, we can wholly prevent inflammatory reaction, local or general, when we perform an operation which entails an extensive mutilation of the tissues. Inflammation may not run into suppuration; but free cell hyperplasia, tumefaction and tenderness, will invariably follow. And the inflammatory products, in the rapidity of absorption, are as much dependent on the general condition of the patient as the local treatment of the wound.

In the old and cachectic I have seen it more than once run into gangrene. This usually was limited to the edges of the incision, which were thrown off by a slough, the parts healing from the bottom, by granulation. Gangrene of the testis is one of the consequences attendant on serious damage to the spermatic artery.

I have never seen general peritonitis follow herniotomy for radical cure. In this age of aseptic surgery it is needless to emphasize the cardinal importance of rigorous cleanliness of everything in the region of the wound, when we are manipulating structures immediately continuous with the peritoneum. It is difficult to conceive of septic infection following an incision into healthy tissues, except through the grossest sort of neglect.

CHAPTER XVIII.

ANÆSTHETICS AND ANALGESICS IN KELOTOMIES FOR STRANGULATION AND IN OPERATIONS FOR RADICAL CURE.

To any one who has carefully studied the history of hernial operations in the past, and who compares their status at the beginning of this century, and in our own times, it must be apparent that there has been nothing which has given them the position which they occupy to-day, in any manner whatsoever, compared to anæsthetics and analgesics.

We have seen that the mortality from kelotomy in pre-anæsthetic times was enormous; perhaps because operative relief was sought only when the patient was *in extremis*.

The mental agony and horror at the very thought of surgical interference, no doubt, in many exceeded the physical sufferings.

The operator must have been rapid in execution in these times. In many intricate, complex hernial cases safety is only possible in deliberation and a cautious dissection. But anæsthetics came and the patient was sent into dreamland.

There were no more forebodings of pain nor of the infliction of it. Yet surgeons, for a long time, clung to the impression that

the patients' prospects of recovery largely depended on their celerity of action and rapidity in execution; accordingly, an operation for strangulation was but the work of a few moments. Old convictions die hard. In fact, one can scarcely be said to ever quite outlive them. And so it was with surgery and anæsthetics, as it was only in very recent times that a younger generation extended minutes into hours and completed the full details of every step, so that to-day in all simple and complicated cases, so complete is the technique of an operation for hernia that a single dressing often suffices until healing processes are practically complete. Notwithstanding the inestimable boon of painless operations in hernia, in ordinary cases of strangulation as they come into the surgeon's hands, their mortality when pulmonary anæsthetics are employed after operation is yet very great. This was a startling revelation to me in my student days, when I so often saw death so promptly follow relief of strangulation by the most skilful operators of that time.

The mortality attending my own operations, on four strangulated cases, in my early hospital experience, was so appalling that I had come to regard kelotomy for strangulation as always an operation of first magnitude.

If we should encounter a gangrenous intestine, cause a great loss of blood, or if general peritonitis supervened, we might account for the loss of life; but when an operation was simple, rapid and bloodless, and the intestine was healthy, yet death supervened within twenty-four or forty-eight hours; and to say that it was caused by septic peritonitis was not satisfactory, because we know that general peritonitis rarely cuts off life in so short a time; besides, it has not been demonstrated that the operative mortality has been reduced since the advent of antiseptics in strangulation cases.

No doubt the deplorable condition that some of those cases often present before the attending physician turns them over to the operating surgeon, often precludes any possible hope of relief by the intervention of art. For cases have been sent into our service at the Harlem Hospital in which, after violent protracted taxis, the intestine has been found ruptured in the sac, and pressed up through the rings to drain its contents into the peritoneal

cavity. In one woman the sac and bowel were bursted by bruising and pressure, so that, as the fascia propria was divided, intestinal gas and fæces welled up through the incision. Again, more than once, the patient has barely survived transportation to hospital, and was moribund, or dead, before preparations to operate were completed. Further, we will find not a few coming in, more or less collapsed, on whom but moderate and cautious taxis has been practiced, yet after a hypodermic of morphine, artificial heat, and a few hours perfect quiet, the spasmodic grip at the neck of the sac relaxes, and the hernia returns of itself, or by very moderate taxis, and in a day or two the patient is himself again.

So deep-rooted and general is the fear of death from operations on strangulated hernia with medical attendants, that many advise or approve of them only after every sort of palliative expedient is exhausted.

We very naturally inquire then why, in simple strangulated cases, the mortality is so great? But a limited breach in the tissues is made, no blood is lost and the operation is not a protracted one; yet we often lost our patients.

My observations during the past ten years have convinced me that *pulmonary anæsthetics* very greatly added to the dangers in operations in strangulated hernia. I am not prepared to say in what manner their lethal action is more manifest in this class of abdominal operations than in any others; yet that total suppression of the urinary secretion and secondary mortal shock often follow, cannot be denied by those called on to perform these operations.

As I have never used chloroform in an operation for strangulated hernia, I am unable to say whether these mortal sequelæ are so common when it is employed. But from what we do know of the greater danger always attendant on its employment in other surgical operations, there is no apparent reason why it should be preferred to ether, the pulmonary anæsthetic which we always employed.

Since Paul Réclus first called attention to cocaine analgesia as a valuable agent in operations in the peripheral structures, I have almost invariably employed it in all operations for strangulated hernia. In twelve operations for strangulations with cocaine,

ten promptly recovered. The cause of death in the one who succumbed is a mystery to me. No *post-mortem* was permitted. In two of those ten which recovered, they were in such profound collapse that there was little prospect of their being able to come out of the coma of an anæsthetic. In one it was employed on a man bordering on the moribund state, who had been operated on imperfectly two days previously, in whom stricture at the neck of the sac had been overlooked. His pulse was 140, weak and thready, the belly ballooned up by the imprisoned gases, and vomiting was incessant. The wound was reopened and the intestine liberated, the patient in full consciousness, but devoid of pain as the edge of the scalpel went through the tissues. He experienced immediate relief, and had a large movement from the bowels within two hours after the operation, ultimately fully recovering.

Cocaine is of priceless value in operations for strangulation. It certainly seems incomprehensible how it is, that an agent of such unique usefulness in this operation, has not, before this time, become better known in the ranks of the profession.

By its judicious employment, as Réclus pointed out, we may dispense with skilled assistance in an emergency, the patient himself giving the greatest aid. If he has diseased organs, their integrity is not imperiled by the saturation of the system with a noxious agent. It is a positive hæmostatic. There is no stage of suffocation and struggle, so common under ether; and no violent retching or vomiting after operation, a time when it is so important to prevent sudden strain on the blood-vessels, or agitation of the traumatized intestine.

Effective cocainization, however, demands a precise technique, every detail of which must be observed, if we would not utterly fail, and throw it aside in disgust, after our first trial.

In a work on hernia it might appear that pulmonary anæsthetics are of sufficient importance to merit a full and separate consideration; but, as these are fully described in the current text-books, it is unnecessary to refer to them in detail at present, except in a cursory manner, and only the clinical phenomena often attendant on their administration.

It goes without saying that in an operation which entails a tedious dissection, it necessitates as perfect immobilization of the

body and the part to be operated on as possible. It is also particularly desirable that all violent movement in the abdominal muscles be restrained after hernial operations.

Now, with pulmonary anæsthetics, it is notoriously the case that a considerable number take ether or chloroform very badly. In some it is quite impossible to induce profound, protracted narcosis without inducing asphyxia. This may recur any time the anæsthetic is forced, so that it is impossible to operate on them with safety while under profound coma.

With another class a general muscular rigidity ensues through all the stages of anæsthesia. As this involves the abdominal as well as the respiratory muscles, it is easy to understand what an embarrassing complication it is, after the peritoneal cavity is opened and the intestine bulges through the opened neck of the sac.

Violent emesis almost invariably sets in, as our patient comes out of ether in many of our most docile cases. But few escape this sequela, while a considerable number vomit freely in the initial stages of anæsthesia. No doubt the escape of the bitter, acrid ingesta into the trachea and lungs while the patient is in the stupor of early anæsthesia, is responsible for many mortal cases of post-operative pneumonia.

Indeed, it would seem that the administration of an anæsthetic, and its sequelæ, are among the greatest dangers attendant on operation for strangulation.

Chloroform is not attended with so many inconveniences, perhaps, as ether, but its lethal action is so often and so suddenly deadly, that unless there is some special condition present permitting its employment, it should never be employed.

In my experience in strangulated hernia, pulmonary narcosis is always attended with a deepening of the collapse in the most serious cases. The ideal agent in hernial operations is one which will temporarily deaden sensation without effecting consciousness, and the employment of which is not followed by vomiting or violent muscular contraction. Such an agent is the alkaloid, cocaine, though its range of application in hernial cases is limited.

In strangulated hernia its use should wholly supplant pulmonary anæsthetics. In non-strangulated herniæ the operations

for their radical cure, to complete in all their details, consumes so much time that the transient action of cocaine will not suffice, except in a very limited number of cases. In those who manifest a marked repugnance to ether, and are willing to suffer a little pain, an operation may be performed with the greatest satisfaction, as I have, on different occasions, demonstrated on men and women.

Before describing the technique of cocainization in hernial surgery, it may be well to briefly notice the phenomena attendant on its application or administration.

Cocaine gives a sense of exhilaration, buoyancy, and pleasure; stimulating the brain to an extraordinary degree, and, at the same time, strengthening the heart's action, supplying precisely thereby in the constitution what the despondent mind and flagging pulse most urgently need in all cases of strangulation.

Locally, it paralyzes the periphery of the sac, sensory nerves; causes a marked contraction of the capillaries, through its action on the vaso-motor filament, and thuswise exerts a marked hæmostatic action.

It is needless to remark that when administered locally, its action is not strictly concentrated on the parts into which it is injected, but it is also taken up by the general circulation; and hence, acts in a dual capacity: First, as a local analgesic; and secondly, as a general stimulant.

TECHNIQUE OF ADMINISTRATION OF COCAINE IN HERNIAL OPERATIONS. CONDITIONS TO BE OBSERVED, ETC.

Before we cocainize there are certain preliminaries necessary to observe of a special character. Contrary to the usual custom of administering the anæsthesia, on an empty stomach, some hours after a meal has been eaten, with cocaine it is always well to operate under it as soon after a meal as possible. The patient should be given freely of an alcoholic stimulant, if the stomach can bear it, immediately before we commence to introduce the analgesic.

It is now assumed that everything at the seat of operation has been rendered aseptic; that a pure drug and a good hypodermic syringe are provided. The needle of the syringe should be

from four to five centimeters long, and of sufficient firmness not to bend in going through aponeurotic structures. It should have a keen, smooth point. A *one per cent.* solution is of sufficient strength. I have never employed less than sixty drops, nor more than a hundred in a hernial operation. In other words, it is well never to go far beyond the average dose by the mouth—from one-third to one grain—when using cocaine subcutaneously.

If we wish to cocainize without inflicting but the minimum of pain, and secure our patient's confidence, it must be done with as few punctures of the integuments as possible. This is to be particularly desired in strangulated cases, in which the tumefied, contused parts are extremely sensitive. Hence, in order to effect this, the punctures through the skin should not exceed three or four in number, and should be in a continuous line over the long axis of the tumor; so situated, from above downward, that the edge of the scalpel, as it is carried down through the integument, will intersect them. The syringe should carry, at least, from twenty to thirty drops. After having been sent deeply into the tissues, the downward motion of the piston is commenced; at which time the withdrawal of the needle must begin, in an oscillating movement, at such a pace that from three to five drops will have been sprayed in the tissues before the needle has reached within six or eight millimeters of the deep layers of the integument. Now, gently turning the needle on its axis—its heel being the pivot—it is again and again sent in until an area, including a considerable radius, is effectually sprinkled. The needle, then, by this procedure, is made to penetrate in many different directions, though we puncture only once. With but a few such punctures from four to five or six centimeters apart, a considerable district can be dealt with.

Certainly one must hypodermize the tissues with as little delay as possible, when he commences; or else its local effects will have passed away before we commence the severance of parts, or we will observe, rather, symptoms of its constitutional action, which in women and children we wish to avoid. Hypodermication completed, the integuments and underlying soft parts are carefully but quickly kneaded with the fingers, in order to thoroughly diffuse the cocaine through the tissues. Now everything being

ready, just before the scalpel is taken in hand, if a syphon of carbonated water is convenient, which has been well chilled, splash its contents suddenly over the surface of the integument. In cases when this has not been within reach I have found a pitcher of cold water, emptied from a height of two or three feet, answers very well as a substitute. Hypodermication should not occupy more than three or four minutes; from its completion, until the division of the tissues is commenced, not more than five minutes should intervene. It may be well to note in hernial operations, that particular caution must be observed not to puncture the extruded intestine or the spermatic cord in male inguinal, nor the femoral vein or artery in crural hernia.

Cocainization is an invaluable aid in subduing muscular spasm, early resorted to in those strangulated cases, in which operation is refused. For this purpose it is much to be preferred to ether or chloroform.

Cocaine analgesia lasts about thirty minutes. Any operator of moderate experience can go through the necessary steps of an operation to relieve a strangulation in that period of time. If he cannot, then he assumes considerable risk, and scarcely does justice to his patient, if an experienced operator is convenient and can be had.

CHAPTER XVIII.

VARIETIES OF OPERATIONS FOR THE RADICAL CURE OF HERNIA IN MODERN TIMES.

Perhaps it might be alleged, inasmuch as it has been declared in a previous chapter, that as no operation has yet been devised which would effect a permanent cure in all cases of hernia, or in every case of any single phase of it, that there would be no room for choice; that one would be equally as efficient as another.

This, however, is illogical reasoning, and only emanates from those prejudiced against every operation for hernia, and every species of sanguinary intervention in non-strangulated cases, or even a strangulated hernia when its reduction is impossible by taxis.

But when it is remembered that almost no two hernial protrusions are precisely alike; that many are of a most complex type; that age, sex, occupation, anatomical structure and general bodily health each has an important bearing in every case, in inclining us to such a line of procedure as is most appropriate, it

is apparent that we must treat the various cases in a technique on essentially different principles.

In the monorchid of early age, in which the testis and intestine are lodged together in the inguinal canal, our efforts will be directed rather toward freeing the adherent testis and bringing it into the scrotum, than to meddling in any manner with the displaced protrusion, which we know usually with the growth of the child will finally lodge within the peritoneal cavity. With the female, whose rudimentary inguinal canal contains no important tubular structures, a technique will succeed with them that has no place in the male.

As the dangers of doing damage to the elements of the cord are great, in separating the tough fibrous wall of the sac from them in many inguinal herniæ, we can see why, in the femoral type, this enucleation of the sac may be invariably advised, while in many of those protrusions passing over the crural arcade it should not always be permitted.

It is clearly evident, too, that we must vary our procedure in the small, easily reducible, and the large, old incarcerated variety.

One man, for cosmetic or other reasons, humiliated by his deformity, about to be married or undergo a physical examination, requests a radical operation; but if his general condition suggests syphilis or tuberculosis, few would care to make a breach in the tissues to expose the sac when the same end might be attained by rest, puncture and pressure.

So, too, with exomphaceles and eventrations, we must resort to different operative measures for them under varying circumstances.

Of recent years we have had what are known as "*open operations*" for the cure of non-strangulated hernia.

OPEN OPERATIONS FOR HERNIA.

These may be divided into two classes: First, those in which a large, open rent is made in the soft-parts, thereby enabling us to expose and manipulate under the eye all the elements of the hernia. With these, as soon as the viscera and sac have been dealt with, the divided parts are so approximated, layer by layer, with a view of closing in the parts, by primary-union. This is the most common.

The second class are those essentially, of the same, in the extent of incision, but the wound is purposely prevented from immediately uniting, by a gauze packing, introduced with a view of securing a filling in by granulation tissue and a cicatrix. The latter, except, in cases of strangulation attended with infection, has now, been quite generally discarded. These operations are essentially laparotomies. There are a great many derivatives of them, as a detailed description, of some of the most current of them—described later—will show.

The fundamental objection against these, so-called open operations is the extensive mutilation or division of the anatomical-structures which their performance entails. The groin and scrotum must be widely opened to enable us to free an adherent sac. To excise the neck on a plane with the general parietal peritoneum, the anterior wall of the inguinal-canal must be split through its entire length to the internal ring.

Now, if the divided parts on reunion regain their pristine mobility and strength, as little or no danger to life is attendant on the incision, the closed-open operation, so to speak, is the ideal. But whether they do or not, in many phases of hernia of an impacted character, nothing approaching an effacement of the protrusion is possible, without such free dissection. The antiseptic-theory gave an immense impetus to free and perhaps—one might say, without straining the truth—not infrequently needless and destructive, gashes into the soft parts, in this and other surgical, maladies. We certainly do know, that a divided bone or tendon, never again, entirely recovers its full strength when cut through; though, such division often serves invaluable purposes. Nor is there any reason why a free splitting through the ligament, tendon, aponeurosis, and muscles of the lower abdomen may not leave a weakness in the abdominal wall.

HYPODERMICATION IN EFFECTING RADICAL CURE.

The hypodermic syringe, shortly after its invention, was promptly utilized as an apparatus which had a place as a therapeutic aid in the treatment of hernia.

It is one of the few agents employed in modern times for the treatment of hernia which was not well known centuries since.

We find the germ of it in the writings of Julius, in the third century, who recommended, after the hernia was reduced, the tract over which it traveled should be opened, lightly seared with the red iron, or with spirits, and be then closed in with the suture.

It appears, that when this method was first introduced it was so awkwardly employed that, though a few were cured of their hernia by it, yet the majority operated on developed peritonitis; not a few suffered from erysipelatous inflammation and gangrene of the scrotum. And, as might be supposed, it was soon condemned and cast aside.

We will see that after an interval, when the syringe became a perfected instrument, and when the pathological processes supervening after subcutaneous injection of pungent chemical solutions became better understood, hypodermication again came into use. Saturated solutions of chloride of sodium, concentrated alcohol, tincture of iodine, extract of oak bark, and other irritants were employed.

When we study the principles, on which the claims of this peculiar therapy rest, and when it is utilized in special selected cases, it cannot be denied that it has a place and must be regarded as a most valuable adjuvant. It lost ground, and was cast aside for the same reason, that very many useful agencies have sunk into oblivion, often before their full merits have been properly tested, *viz.*, because the champions of them made them *a cure-all*.

With those desirous of a cure of their hernia, without a mutilation, when this is an indirect, inguinal of small volume, and the sac with the viscera can be *wholly* returned, it is certainly rational to assume, that used in conjunction with other tentative measures, it may succeed. Indeed, there are too many well authenticated cases in which it has effected permanent cures to dispute its claims. In our time, we can render the injecting fluid absolutely aseptic, there can be little danger of infection, or of any accident, except, directly charging a blood-trunk or penetrating the wall of the bowel. Hence, this procedure, when devoid of accident, in many, must claim preference to those, which entail the sacrifice of tissue; and, as a result may be followed by a relapsing hernia, perhaps worse than the one which their employment intended to cure.

The range of hypodermication as a means for treating hernia is very limited, for with the exception of such phases of inguinal hernia as stated, it is of doubtful, if any value. I am acquainted with no reported successful cases of femoral or umbilical hernia treated by this means.

MODE OF ADMINISTRATION AND CONDITIONS TO BE PRESERVED IN HYPODERMICATION OF HERNIA.

As in the hypodermic administration of cocaine the integuments must be thoroughly disinfected.

We have a set of hypodermic needles of various lengths, strong and unyielding for different cases; as we will meet with those who have immense layers of abdominal fat, as well as the lank and lean. Warren, of Boston, invented a special syringe for these cases, which, when introduced by a movement of the piston, underwent a rotatory motion, which in this way was supposed to have effectively saturated the peritoneo-vaginal canal. The ordinary syringe, nevertheless, is equally useful, and not so liable to get out of order.

Of the many solutions recommended, probably the preparation of the charlatan, Heaton, is the most useful of all. For the basis substance, oak bark, is a powerful astringent; the pure alcohol in it, an antiseptic with the morphine included, nulls all immediate pain. But a few drops of this solution, from three to ten, are ample to employ.

Now the finger having fully reduced the hernia, its tip is pushed still upward and backward, until the aperture of the internal ring is felt, when the point of the needle is introduced over the nail, care being observed not to injure the cord, and to lodge the fluid in the loose, connective tissues, between it and the fibrous walls of the infundibulum.

After the fluid has been deposited, a narrow pointed conical pad must be applied, under a firm spica bandage, over the external ring and canal. So much for technique; now there are many things which must not be overlooked when this line of treatment is selected.

Undisturbed, protracted rest, is indispensable. This must be carried out with rigor, or all fails, after the injecting fluid is

lodged. Accordingly, in order to secure quiet to the inferior segment of the intestinal canal, for five or six days after operation, the patient should have been freely purged the day before we operate, and occasional small doses of opium are needed after the intestine is cleared.

To attain this same purpose the patient should be kept on low diet, and all solid food prohibited for ten days. As there is no wound inflicted in the procedure, there is none to dress. Yet, immediately over the internal ring, firm, methodical pressure must be continued uninterruptedly for four weeks to ten or more. In young subjects, with recent hernia, confinement to bed for a shorter time will suffice than in older subjects, who have had large protrusions.

The success of this simple expedient is dependent on two principles.

1st. With restitution of the viscera, with all weight and drag removed from the elongated mesenteric ligament, it regains its normal, contractile power, and swings the rolling intestine far enough away from the rings to prevent it from again engaging and slipping outward.

2dly. The injected fluid when properly lodged, affects the solid cementing of the hernial vent; 1st, by its pungent irritating properties, exciting inflammatory exudate; and 2dly, by a condensation and fibrous infiltration of this plastic material into the meshes of the adjacent tissues, in such a manner as to firmly contract and obliterate the pre-existing lax and open passage.

Were it not for the fact that the viscera are commonly adherent in female inguinal hernia, for this type, in this sex, it would be the ideal. In the reducible inguinal, complete, of young women, this method should be fairly tested before any species of sanguinous proceeding is entertained.

ACUPUNCTURE.

The introduction of pins or needles introduced subcutaneously, transversely to the long axis of the canal, in simple, reducible male inguinal hernia has been employed, and we are assured with occasional success. The aim has been to secure adhesive inflammation, when the sac was held down by adhesions. By this

plan it is impossible in fleshy subjects to effectually obliterate the lumen of the funicular envelope beyond the external ring.

It is an operation which, when performed with care, entails no danger to life, and in certain simple cases unquestionably has a place. In young children, in whom there is practically no inguinal canal, it may be employed with good prospects of success. And if it should fail to cure the hernia, when proper precautions are observed, it can seldom do harm.

The greatest danger attending its employment is the risk of injuring the structures of the spermatic cord. Hence, before the needles are introduced, the cord must be lifted out of its bed and drawn aside, leaving the walls of the sac freely isolated. The desideratum is to so adjust the needles with sufficient pressure as to effect occlusion of the serosa, without having them cut their way out to the surface. In certain patients they cause so much pain as to require their early withdrawal.

As acupuncture must be practiced chiefly by the sense of touch, and as tetanus or gangrene of the testis has been known to so often supervene after its employment, its application is feasible only within very restricted limits, and is justifiable only in the hands of the adept and in exceptional cases.

CHAPTER XX.

INVAGINATION.

Besides the various means heretofore noticed to effect an obturation of the hernial portal, in the early part of the present century, none, for a time, enjoyed greater favor, was more widely employed, or was more free from danger to life, than the procedure first introduced by Gerdy.

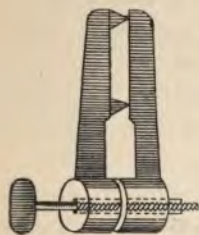


FIG. 15.

It will be observed that Gerdy's instrument was a rather clumsy and formidable machine (Fig. 15), consisting of a double lever, bulb and screw, and two teeth. But it appears that he soon cast this aside and substituted for it another more simple contrivance, which consisted in a long, concealed cannulated, curved needle (Fig. 16), the



FIG. 16.

employment of which was not attended with difficulty and was very generally employed.

In employing this method the patient was placed on his back with the knees drawn up. The surgeon now, with the index-finger of the left hand, reduces the protrusion, sac and all; after which, after pressing upward and maintaining in position, close to the internal ring, a double looped silk ligature is sent out through the cannula, the finger serving as its guide, penetrating all the tissues, from within outward, until it reaches the surface (Fig. 17), leaving a loop above, fixed in an ammoniated pledget of cotton. The point of the needle was withdrawn completely and again sent through, coming out on the surface about twelve millimeters from the first, the loop presenting being engaged with a tampon as the first. The loops, now below, are drawn on firmly until the indented integument below, completely blocks the canal, and the serous surfaces of the sac and parietal peritoneum are compressed in direct contact with each other. It will be noted here that the needle is passed inward, some distance beyond the pillars of the internal ring. It is not clear, whether it was intended that the general cavity of the peritoneum was to be entered and transfixed, or that the fascia was pushed forward by the finger, the puncture being wholly extra peritoneal.

It is not stated how long the ligatures were left *in situ*, though it must have been considerable time, as they often penetrated their way through, before they were removed. Of this operation we are told, that with few exceptions, within a few months after the patient took his feet, the scrotum retracted, and the hernia returned. The author claimed that it was not on the principle of mechanical obliteration that a cure was sought, but rather, by a phenomenon of



FIG. 17.
First step in Gerdy's operation.

a *retractive inflammation* of the cellular tissues in the canal and rings. Active inflammation, tumefaction and suppuration were common sequelæ of this operation. The patient was always enjoined to wear a truss for a considerable period after this operation. This operation was not applicable to femoral hernia, nor the inguinal type in the female.

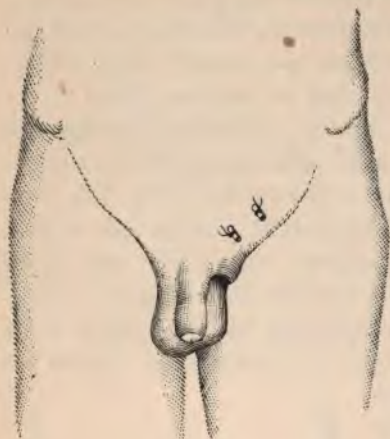


FIG. 18.
Gerdy's procedure completed: invagination maintained by a double suture.

INVAGINATION BY OTHER PROCEDURES.

There have been since the times of Gerdy very many derivatives of his original scheme. By Lehman, Wützer, Benne, Zeiss, Schuh, and others different variations were essayed.

Signorone's operation was known under the name of "*intro-roversio cornuta* ; or *chilissochisorrhaphie*." This bold operator conceived the idea of so far invaginating the scrotum as to give it a turn over Poupart's ligament, pushing the integument out above or on one side of the femoral vessels, and fixing the scrotal tissues in the falciform fascia, at the saphenous opening; a procedure, says Broca, as extravagant as it was barbarous.

Maisonneuve, inspired, it is said, by a successful operation of Dupierris, of New York, after having invaginated the integument as far as possible, divided the tissues from without inward; thereby opening the peritoneal cavity, sutured the deeper layers of tissues together; and then secured the parts by a cutaneous stitch. Thierry proposed the following modification of Gerdy's operation: He invaginated the scrotum with the little finger, then introduced a threaded, curved needle; which, after emerging about six millimeters below the superior edge of Poupart's ligament, was reintroduced through the same puncture. Finally, the free ends were firmly knotted over a small pad of charpie and retained, until adhesive inflammation contracted the canal.

Coste, of Marseilles, proposed a cure for femoral-hernia by invagination. There was nothing new in the principle applied, or the technique employed. Yet Pétrequin once obtained a success by it in a very severe case. The patient was a woman forty years old, who had a voluminous hernia. The crural opening would admit four fingers easily, as far as their roots. Pétrequin after reducing the mass, cut away the superficial layers of the skin and transfixed the broad edges of the ring with four heavy pins. The cure was complete after a month; but, as there was a tendency to relapse, it was rendered easily coercible with a truss.

Giraldès conceived and practiced a similar procedure for the umbilical hernia of children. As seen in Fig. 19, it essentially consists in passing a suture completely through all the planes of tissue, encircling the umbilical operation, after hernial reduction, and drawing the free ends together over a pad of lint.



FIG. 19.

WÜTZER'S OPERATION AND ITS DERIVATIVES.

Wützer conceived the idea of substituting a foreign body in invaginating, instead of the finger; and maintaining this in position until the inguinal canal had contracted adhesions. Broca and Leroy, however, had anticipated this surgeon, in having presented to the French Academy, in 1835, a memoir on the subject of maintaining invagination by special instruments. But Wützer perfected the operation, and through his writings popularized it.

Wützer's first operations were in 1838, and he named his instrument an *Invaginaterion Kelek-leison*.

This instrument is applied in two sections. One is a hollowed piece of wood with a smooth, conical point, which is introduced into the inguinal canal its entire length. Then a curved needle is made to pass



FIG. 20.
Rothmund's Operation.

over the upper surface of this tube, emerging through a perforation near the point, when it enters the second piece. At



FIG. 21.
Invaginator of Valette.

this stage, a notch in the second plate fits into an upright screw, when it is firmly fixed in position. Sigmund, of Vienna, with Spencer Wells and Bedford Davis, of England, as late as 1861 were

partisans of this method, though Wells warned his patients to be slow in discarding the bandage when this method is adopted.

Rothmund, of Munich, devised an arrangement very similar to Wutzer's, except that it was more powerful, and instead of employing one suture introduced half a dozen.

Valette made another modification of Wutzer's operation, adding to it cauterization of the anterior wall. The instrument in place, a paste of chloride of zinc was applied in the center, or fenestrum of the anterior blade, and firmly



FIG. 22.
Valette's Invaginator.

held in position by a bandage until it had thoroughly destroyed the underlying tissues.



FIG. 23.
Valette's Process.

Now, the clamp was removed, and the sloughing parts healed by granulation, after the slough was thrown off.

This procedure certainly effaced the canal, most surely, for the simple reason, that by this cruel device it was totally destroyed, and it is difficult

to see how the spermatic cord escaped, or the peritoneal cavity

was not invaded. It made havoc in the tissues, and when the patient survived, left a painful, deforming cicatrix, and did not guarantee a permanent cure. Valette operated on six patients, losing but one, though there are no data showing the permanency in cure of those who escaped with their lives.

Le Roy d'Etiolles, Langenbach, Wattman, Christopher Heath and others, each have made various modifications on Wutzer's and Valette's operations, which in no essential manner varied from each other, except in unimportant particulars.

All of these operations, embracing the principles of Gerdy's



FIG. 24.
Kinloch's Kite-tailed
Tampon.



FIG. 25.
Kinloch's Process. Passage of the Thread.

invagination, have been repeatedly performed by a past generation of American surgeons, notably by Mott, Pancoast, Wood, Nathan Smith, Bigelow, Kimball and Post.

The late Dr. R. A. Kinloch, the first surgeon in North America to successfully laparotomize for a gun-shot wound in the intestine, in his lifetime also competed for honors in hernial surgery. Kinloch's operation in principle and detail but slightly differed from Wattman's and others. He had operated when he had submitted his essay but twice; and, as neither patient had returned, he was unable to report on the permanency of the cures effected.

Symme, Davies, Fayrer and Egea have reported operations performed by them by a special technique in invaginating.



FIG. 26.

Kinloch's Tampon being inserted into the canal.

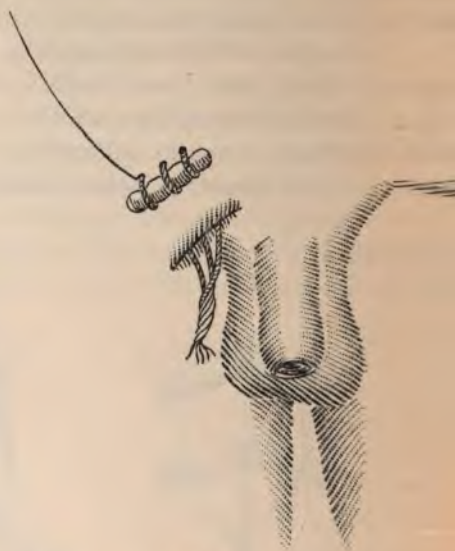


FIG. 27.

Kinloch's Process. Tampons in place maintaining Invagination.

Sotteau, by a special contrivance of his own, maintained invagination by the aid of an instrument, which permitted the mechanical apposition of the hernial orifices.

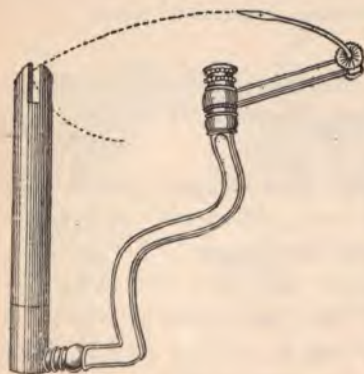


FIG. 28.

Invaginator of Sotteau.

The fundamental difference between this operation and those for invagination, already described, is that the author aimed to effect obliteration rather by securing closure of the portals, and rejuxtaposition of the fibrous walls by mechanical aids, than by adhesive inflammation.

Sotteau's instrument is very complicated. Sotteau commenced

by anointing the wooden invaginator with an ammoniated pomade, which was then pressed firmly against a fold of the skin and carried far up the canal. A suture is now carried across the pillars and fibrous walls of the canal several times, when the invaginator is withdrawn and the suture tightened.

To secure continuous compression, the instrument here presented is applied, when the hernia is very large and chronic.

Roubaix reported a very remarkable case of an enormous crural hernia in a woman sixty-four years old. She was suffering from strangulation. There was gangrene of the intestine, and an artificial anus followed, which closed after four years' time. After a sudden strain, however, the old cicatrix in the abdominal wall gave way, and a very large hernia followed, which no truss could control. Now the case came into Roubaix's hands, when, by employing the operation of Sotteau, he succeeded in entirely closing the hernial aperture, dividing and cutting away the redundant integuments.

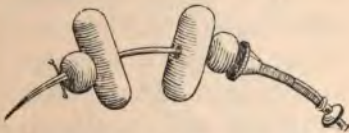


FIG. 29.

Sotteau's Invaginator with the wooden compressor in position.

We are not informed as to the durability of cure, as the patient was lost from sight after leaving the hospital; though it is fair to assume that this enormous deformity (Fig. 30) was entirely restored to its normal abode, and rendered at least coercible.

In the second cut (Fig. 31), we see the deep shotted clamps in place, which effectually hold in place the inverted edges of the skin, and the superficial harelip pins.

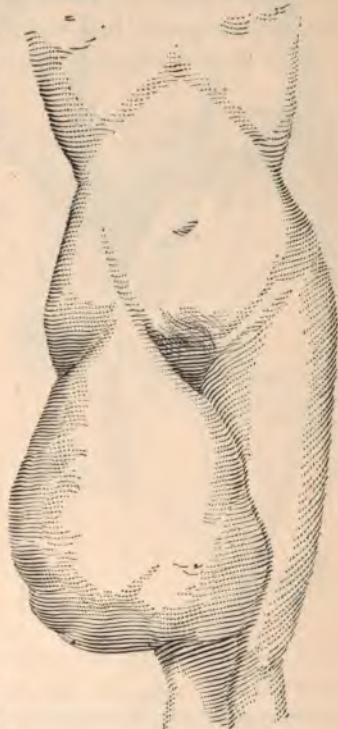


FIG. 30.

Hernia operated on by Roubaix.

It would seem from this illustration that as soon as the powerful metallic braces were removed, after union of the parts, unless some sort of a strong, well fixed support were adjusted, there would be great danger of another eventration.

Wood, of London, in 1858, made another modification yet, or

rather added a new feature to the technique of hernial cure by invagination, for his method embraces the invagination of the sac and *direct* suture of the hernial orifice. In 1863 he described in detail the various steps of his new procedure. Wood aimed at obliterating the track by adding to obturation by invagination the contraction by suturing the pillars.

It is a subcutaneous operation, delicate and difficult of performance. Many have claimed that although Wood wrote at length on this operation and modifications which he made in it, yet his style or language was so ambiguous and confused, that a full and close description of it from him has never been rendered. To myself I must confess it has not been easy of comprehension.

In Wood's first operation he employed two transfixion pins in each case. The pins were rather short, strong and

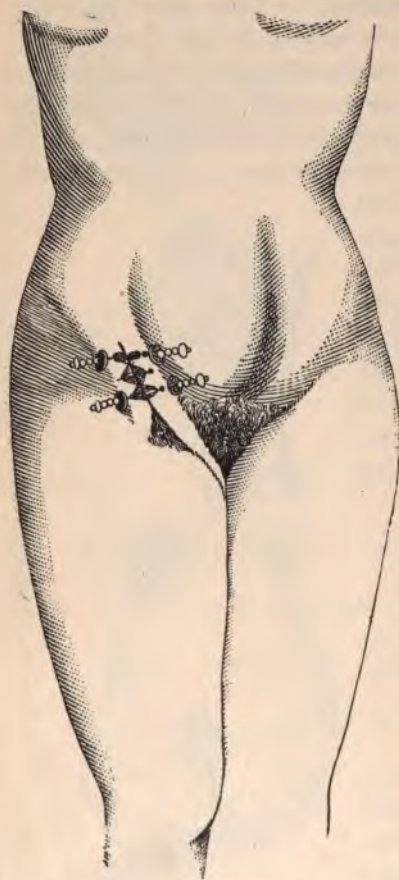


FIG. 31.

Roubaix's patent with the clamped pins in position.

curved. One passed below, through the integument, sac and external pillars. The other pin entered in a more oblique direction to the inclined plane of the body, and included the neck, internal aperture and skin. By this dual procedure of invagination and

approximation enough of adhesive inflammation was hoped to follow to insure an obturation of the passage. Many English surgeons have testified to the immediate curative effects of this operation; but we have no proof that the truss could be dispensed with after cure followed.

The same author devised a second procedure by *invagino-suture*.

The instruments necessary for its performance consisted of a curved needle perforated near its point, mounted on a handle; a bistoury, a strong copper or silver wire suture and a glass compressor.

The operation was commenced by making an incision through the scrotum, introducing the index finger and invaginating the sac as high as possible, then introducing the needle, armed with a



FIG. 32.

Radical cure by Wood's needle.



FIG. 33.

Radical cure in inguinal hernia. Wood.

strong hempen thread; first transfixing the sac, then the internal pillars then the posterior and external walls. The free loop being brought out, it was securely tied. Now a conical, smooth block of non-corrosive substance was firmly applied to effect steady pressure. After two weeks the compress was removed, but the suture was continued longer (Fig. 32). Wood soon abandoned the use of

hemps, and on the last two hundred and seventy-five patients employed silver wire instead.



FIG. 34.

Radical cure of Inguinal Hernia. Wood's method by simple suture. Suture in place: knotted on a compressor.

This suture greatly simplified the operation; first dividing the aponeurotic tissues, then liberating and exposing the sac, in-

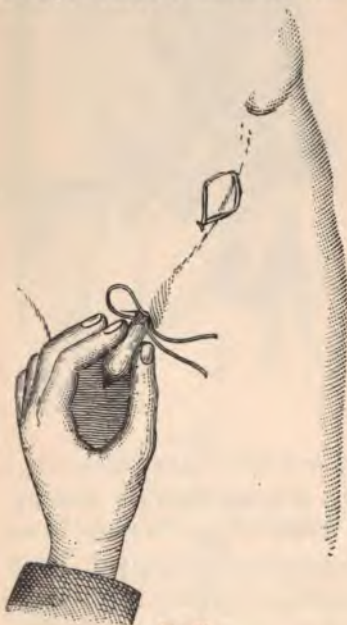


FIG. 35.

Radical cure of Inguinal Hernia. Wood's procedure with silver wire in position.

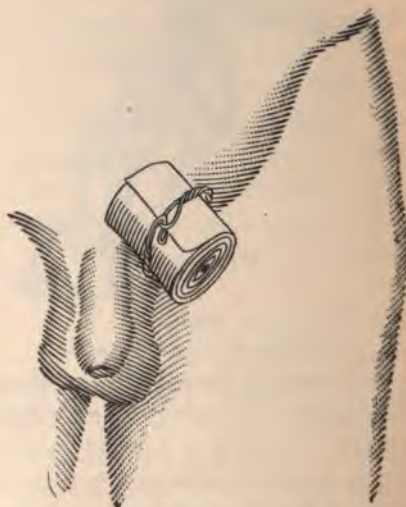


FIG. 36.

Another procedure of Wood's.

vaginating it from below, when the wire sutures were again employed, passing deeply through each pillar; the ends being secured with sufficient firmness to approximate the edges of the pillars and obliterate the infundibulum (Fig. 33).

Wood made various modifications of his operations, which were set forth, at length and in detail, in the *London Lancet*, of May 29th, 1858.

Dr. D. Hayes Agnew, of Philadelphia, Pa. (U. S.), made a modification of Wood's operation. Agnew devised a sort of bivalve speculum; one blade of which, the under one, was concave on its inferior surface. The outer blade was convex on its outer surface. The center of the lower blade was grooved for the passage of the needle. The blades could be opened and immobilized by a screw in the



FIG. 37.

Invaginator of Agnew, after Ashhurst.

handles. The operation is begun by incising the integumental coverings of the scrotum, for two or three inches, just below the external ring. Now, by the use of a finger, the underlying structures are liberated or detached from each other, when the closed speculum is introduced as far upward as possible into the inguinal canal.

The speculum is so placed as not to injure the cord. Now, the blades are widely separated and fixed in an open position. After this a long curved-needle is made to traverse the grooved track on the surface of the anterior valve, which, at its extreme end, pierces and passes out through the skin.

Another suture is, in a similar manner, sent in on the lower

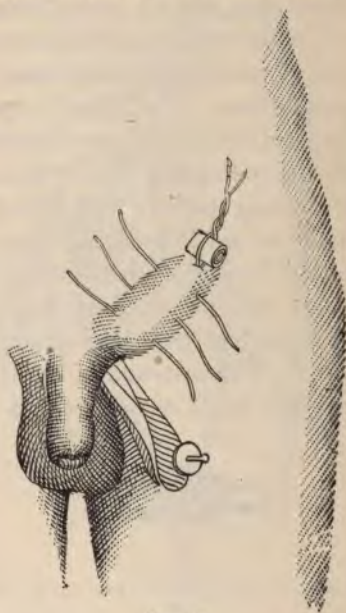


FIG. 38.

Procédé d'Agnew. Three sutures are in place.

conductor. At this stage, the free ends of the suture alone are secured over a roller, while those inside, as in Valette's operation, are passed over a pledget of lint, and are firmly secured. Then three or four sutures are passed through the integuments along the plane of the inguinal canal. They are now tied, when the speculum is slackened and withdrawn. For suture material, silver was employed for the long deep suture, and silk for the superficial parts. Over all a firm *spica* bandage was applied.

The operations of Chisholm, Van Best, Jessett, Field and Thompson, are all derivatives of Wood's.

Spanton invented a sort of cork-screw instrument, with which he traversed the inguinal canal, after effecting invagination. In its application, as in Wood's operation, the skin over the superficial ring is divided, and the deep tissues detached with the finger. Now, the index finger of the left-hand securing complete invagination and protecting the cord, this spiral arrangement is twisted alternately through the integument, sac, and pillars until its point has made its way out above. The instrument is left in place until active inflam-



FIG. 39.
Instrument of Spanton.



FIG. 40.
Introduction of Spanton's Instrument.

mation is developed — from ten to fifteen days. Spanton operated on thirty patients with twenty-six successes and four

ameliorations. Many of his patients, it is said, could entirely dispense with the truss, after cure.

Invagination of the sac and suture of the ring has been recommended for crural and umbilical hernia.

In Bryant's and Gant's treatises on "Practical Surgery" the technique and illustrations by cuts are fully set forth. In umbilical hernia this method has been extensively employed. In early times the wire suture was employed; but latterly after

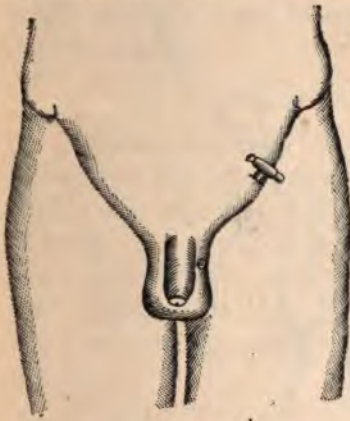


FIG. 41.

Spanton's instrument in place.

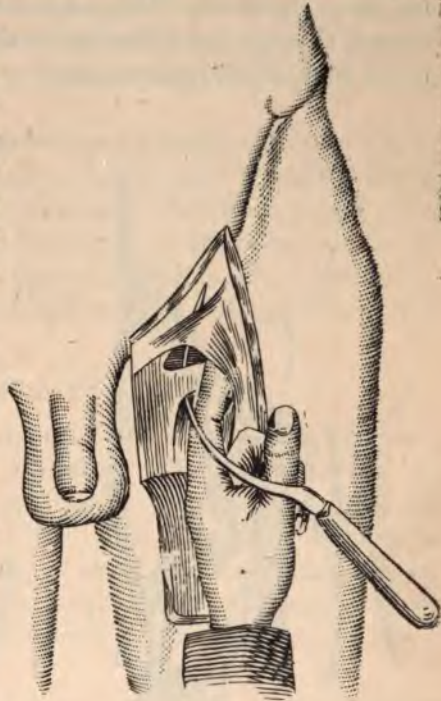


FIG. 42.

Radical cure of femoral hernia, by Wood's method.

the skin was incised and the hernia was reduced, a heavy absorbable suture was substituted, to draw the margins of the hernial orifices together, after which it is buried in the tissues.

Mr. Bennett, of London (*Med. Press*, August 10th, 1892), has recently contrived another invaginating plan. It might be designated "pedal invagination," as by it the sac is stripped and excised, the remaining stub or neck being invaginated. It is another modification of Wood's operation. By it the sac is cut off just outside the external ring, after being ligated, then a heavy needle, armed with strong silk, is passed downward from without,

through the abdominal walls, making it traverse the neck and project below the obturated part. The needle is then withdrawn, leaving the silk, one end coming out through the abdominal parietes; the other, the outer side of the pedicle just above where it had been ligatured. The needle was then again passed, without thread, through the abdominal-walls, but at a point just opposite to the first needle-puncture, and on the inner side of the ring, but

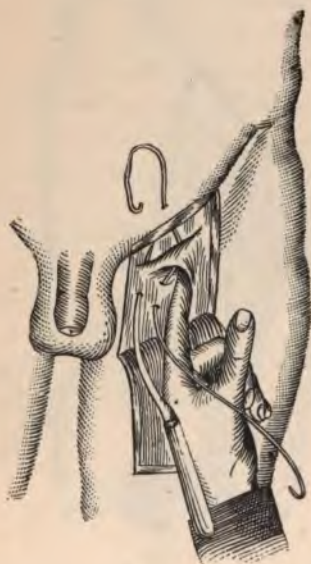


FIG. 43.

Radical cure of femoral hernia by Wood.
Introduction of the suture.



FIG. 44.

Suture in place in Wood procedure for radical
cure of femoral hernia.

at a point opposite the first needle-puncture, the needle being this time made to project on the inner side of the neck, opposite to where the thread came through it, the silk is now passed through the eye of the needle and the latter withdrawn, leaving the free ends of the silk projecting from the abdominal parietes, the result being a loop thrown over the obliterated end of the pedicle. Traction is now exercised with the effect of turning the remains of the sac outside in, the apex being fixed to the peritoneum by securing the two projecting ends of the silk.

Mr. Bennett claimed for this procedure the advantage of the complete invagination of the remains of the sac, the result being that the posterior portal was protected by four layers of peritoneum, while, by their consolidation, a firmer form of barrier is secured than by any other. In large, old hernia, he always employs silk, but in mild, recent cases, cat-gut. In completing the operation, he sutured the pillars before closing the wound.

Indeed, the number of operations for invagination, which are all derivatives of Gerdy's, Wutzer's, Valette's, and Wood's, is almost interminable; which, though to rehearse them here, might be of interest to any one desirous of securing all the literature on the subject of invagination, in the therapy of hernia, as I conceive that it will serve no useful purpose, and as space will not permit, will not be considered.

OBSERVATIONS ON INVAGINATION.

Invagination, as an operation for radical cure, for a long time, alone, held the field against all others in reducible hernia. Its application, indeed, constitutes a distinct epoch, but its cause was suddenly cut short, when, in 1873, John Chiene, of Edinburgh, and Charles Steele, of London, at about the same time, revived the "radical cure" by the free, "open incision," employing, for the first time, antiseptic solutions and dressings in hernial operations.

This was the beginning of a revolution, which gave invagination a staggering blow, and it seemed, for a time, that it had forever driven Gerdy's operation, and its manifold derivatives, into oblivion. Hence, if operations by invagination were noticed here, it would seem that anything approaching a full description of them would be a needless consumption of time, as a mere reference to them for historical purposes should suffice. But, as Segond* so aptly expresses it, "antiseptic surgery will not radically cure hernia." And it is a question by no means yet decided among the most extensive operators, whether our more modern operations, in all cases, are any improvement on some of the older and simpler methods. As a matter of fact, Dr. William T. Bull, at the meeting

* Cure Radicale Des Hernies, p. 170.

of American Surgeons in 1890, declared that, after an extensive experience, he had concluded that in ordinary cases of inguinal hernia the simplest operation was as efficient in securing a permanent cure as the more complicated. Besides, in support of the position of Bull's, which was regarded as most preposterous at that time, the old-time simpler operations by invagination are carried to the front again.

CHAPTER XX.

THE RADICAL TREATMENT OF NON-STRANGULATED HERNIA BY SUCH MODERN METHODS AS REQUIRE AN OPEN INCISION AND FREE DISSECTION OF THE SAC.

In recent times, until the Listerian epoch of antiseptics, when the theories of the distinguished Scotch surgeon were very generally accepted and put into practice—about fifteen or eighteen years ago—we can find no modern author on surgery recommend or justify a free division of the tissues in any description of hernia whatever, except strangulated, or such as immediately imperiled life or invalidated the patient. For the reducible, the congenital or incarcerated, the principles on which they should be treated, on tentative lines, are given in fullness and detail, though in general, except, perhaps, in invagination in exceptional cases, no reference is made to any sort of sanguinary measures.

The first to apply antiseptics to the surgery of hernia were the English. They were promptly followed by the Germans, who became extreme antiseptists, and commenced to cut freely on reducible herniæ. The Americans, who are now largely influ-

enced by the German school, soon followed, while the French and Italians have been the latest in adopting kelotomy for the non-strangulated. Indeed, as recently as ten years ago, M. Paul Ségond, from whose work I have so freely drawn in the historical parts of this monograph, in Paris, wrote with great energy and convincing argument against every variety of operation for hernia, unless the patient's life was in danger, or the hernia was incoercible to the truss and a source of constant distress.

This distinguished author, however, at the French Surgical Congress in 1888, reported fourteen operations on non-strangulated hernia, and besides has since written to me that he now regards those operations in a different light, and considers them, in non-strangulated hernia, in appropriate cases, as a very valuable surgical expedient.

M. Félizét, three years ago, wrote a special monograph on the "Radical Cure of Hernia in Children," a translation of which, by me, has run through several issues of the *Southern Medical Record*.

Dr. Justin Lucas-Championnière, of the Tenon and St. Louis hospitals, of Paris, early in this year published the most complete work that has yet appeared in any language, on the subject of hernial operations on non-strangulated cases (*Cure Radicale des Hernies avec une Etude Statistique*), in which he reports 270 operations by himself, from June, 1881, to February, 1892. It cannot be said, however, that French surgeons, as a rule, favor radical intervention, or approve of the enthusiastic recommendations of Championnière. With the Germans, English and Americans, those operations are not now advocated so indiscriminately as they were but a few years ago. Nevertheless, to one going through the surgical hospitals of the British Isles and the continent even now, the number of cutting operations for reducible hernia, which he will daily witness, is something enormous. They furnish an immense abundance of clinical material for operation. But, as thousands of the herniated have been treated by radical intervention within the past ten years, it would seem that by this time some sort of consensus of opinion should be reached as to which operation is the simplest in technique and permanent in its effects. Besides, the precise extent of danger to life should be

indicated, and the proportion which has not relapsed. From what can be gathered from authentic sources, it appears that the mortality is about one *per cent.* on non-strangulated cases.

Bull says the mortality is practically *nil*. It is assumed that he must have reference to those recent cases occurring in the hearty and vigorous. In my own fifty-seven cases for radical cure in the strangulated and non-strangulated, in the past six years, there has been no death except in those of the former, which were collapsed when operation was undertaken.

Juillard maintained that as relapse occurred after all operations for radical cure, it was immaterial what special method was adopted.

If this surgeon intended to convey the impression that no case was permanently cured by operation for radical cure, it is quite needless to say that such a sweeping assertion will not be supported by any impartial observer of considerable experience. But if he wished to be understood as claiming that no operation could guarantee against relapse in all cases, his declaration cannot be disputed.

It is important that we are fully sensible of all the consequences which may ultimately attend these radical operations before we undertake them, or make any promises to our patients. In this connection it may be inquired: In the event of hernia relapsing after operation, is it as coercible as before anything was done by the surgeon? With reducible, trussable hernia, when the open operation with free division of the tissues is performed, there can be no question but that with a considerable number, when they relapse, they are more unmanageable than they ever were before. I have seen a few of this description, which no sort of prothetical appliance could comfortably control.

The open method, however, in certain cases, is the only one which will enable us to deal successfully with many phases of hernia.

In order that a reasonable estimate may be made of the precise or approximate value of the numerous modern operations which have been recently alternately vaunted, severely criticised, or condemned, and with a view of according to each its just merit, and demonstrating their defects and shortcomings, a brief

notice of a few of the more common and popular will be described here.

For the purpose of reducing their description to a simple analysis, they may all be divided into—

1st.—*Those in which the sac is ligated at the external ring, and permitted to remain in situ.*—Reisel.

2d.—*Those in which the sac is freely and completely dissected; the canal in inguinal hernia divided from the external to the internal ring; the sac ligated and cut away; the parts again closed in, layer by layer.*—Championnière.

3d.—*Those in which essentially the same steps as in the preceding are carried out; but the divided inguinal canal is kept open, and the healing is by granulation.*—McBurney.

4th.—*A complete detachment of the sac from its adhesions, and its utilization as a plug, to serve as a barrier against relapse.*—McEwen.

5th.—*The isolation and section of the sac and its excision at the internal ring; splitting the internal ring and lifting the spermatic cord entirely out of the inguinal canal; then wholly obliterating the canal by tendinous approximation.*—Bassini.

It will be apparent that this quintuple division, in the manual of operations, applies chiefly only to typical, indirect, uncomplicated inguinal hernia.

In large bubonocoeles, in direct inguinal, in those inguinal of a congenital type, or in those in which evolution of the hernia through direct rupture of the sac has been sudden, as well as in femoral, umbilical, or many other phases of hernia, it has little or no application.

The first feature of all those modern "open operations" which attracts one's notice, is the extensive division of sound, anatomical structures in their continuity. If we could but assure ourselves that this free cutting across or through muscle, tendon, or aponeurosis were not in a certain sense a mutilation, and that the resulting cementing together of the divided parts would not diminish the strength or pliancy of the traumatized structures, there would be little hesitation in deciding on the most appropriate course to pursue in any case. If in inguinal or femoral hernia we could obliterate a canal, and yet leave one, a difficult problem would be solved, as we will see further on.

THE MANAGEMENT OF THE SAC IN OPERATIONS FOR RADICAL CURE.

Very much diversity of opinion yet prevails as to the management of the sac in hernial operations for radical cure.

In the operation recommended by Socin, Nussbaum and Reisel, the viscera are reduced, an incision is made through the integuments, the neck of the sac is isolated, ligated at the external ring and cut through. This course of incomplete dissection of the sac, or hernial cavity proper, is observed on the ground that as it is almost always intimately adherent to and incorporated with the elements of the spermatic cord, its enucleation is not always possible, without doing serious damage to this organ. As a matter of fact in all cases, with few exceptions, in reducible, irreducible and incarcerated complete inguinal hernia, the sac extends down to the testis, and if it is so lodged, not alongside of but in the midst of the vessels, nerves and duct of the cord, it will always require a tedious dissection to entirely disengage it from the cord. This is of prime importance to remember when the modern operation is undertaken, and the proper manipulation of the adventitious structure is considered.

There does not appear any valid objection to leaving the sac lodged, when it is firmly held by old adhesions, and through which its nutriment supply is drawn. As now the sac has no further function to conserve, in obedience to a well-known law in the economy, it undergoes contraction with disintegration and absorption. In crural and umbilical hernia it is always considered important to completely enucleate the sac, as in these districts its walls are generally free and its entire extirpation is supposed to permit the more complete consolidation of the tissues, on the perfect sclerogenesis of which the barrier against relapse is secured. This operation, commonly known as Reisel's, though it was many times performed before he described it, is the simplest of all open hernial operations, and applicable to certain definite phases of the infirmity. With these, it should be preferred to any other open operation. It is simplest of performance, entails the least mutilation and effects all that any operation can, without the dangers of many others. By it the elements of the cord are but slightly disturbed, the scrotum is not opened, nor the cavity of the peritoneum exposed to the risk of infection.

THE CLASS OF CASES IN WHICH CERVICOTOMY AND DELIGATION SHOULD BE SELECTED.

1st.—Every case of non-adherent ventral, crural, and umbilical hernia.

2dly.—In all inguinal hernia in which there are: (a) great distention of the inguinal canal (large incarcerated bubonocoeles); (b) those which have no canal; (c) in all direct inguinal hernia.

3dly.—In those cases in which, for various reasons, it is important that we must operate with haste.

1st.—Although with very rare exceptions hernia is never met with, except as a visceral escape through some natural outlet of the peritoneal cavity which serves as a passage to a tubular structure, yet it is quite unusual that the peritoneal investment which encloses it, is intimately fused with contiguous parts or vessels, except in the inguinal variety, so that, except with the latter, it is always well, unless special contra-indications prevent, to lift the sac out of its bed and amputate it high up.

2dly.—In large, old incarcerated bubonocoeles, in which it is discovered that the vessels and nerves of the cord are spread over the entire circumference of the sac, like so many strands or cords over the dome of a parachute, and have become, through fibrous changes, so adherent as to be detached with difficulty and danger, enough has been accomplished when the sac is opened up to the internal ring or near it, its contents freely liberated and returned, its neck freed, twisted, stretched, and transfixed, and firmly secured by the multiple chain suture of Championnière, and cut across. With a view of destroying the epithelial and glandular coats of the sac, this having been well opened, the serous surface is freely sponged with strong alcohol or a solution of the chloride of zinc, so that its lumen may be immediately destroyed and an active reactionary inflammation excited, which will firmly weld everything outside the spermatic cord into one dense plaque of fibrous tissues.

Those which have no canal.—In the infantile type of inguinal hernia, as there is practically but one ring and hence no canal, other tissues must be utilized as a tampon. With them we will find a condition which will strike one as rather singular who is accustomed to regard *rupture* and *hernia* as synonymous terms, or

who has an impression that all hernial infirmities, with few exceptions, do not present their initial morbid anatomy at or even before birth, for, even within a week or two from birth, we will nearly invariably meet with a thick, dense, adherent sac. In chronic serotocoeles of those advanced in years, we will meet a practical obliteration of the canal through the pillars having given way, and either orifice having so spread out, that all obliquity is lost and nothing remains but one large hiatus into which three or four fingers may be readily introduced. When the radical operation is essayed in this undesirable class, we are not concerned with a physiological inguinal canal, for there is none. Marcy, in his work entitled the "*Radical Cure of Hernia*," however, describes a technique by which, with the employment of the buried kangaroo suture, the obliquity of the canal may be restored. It is obvious that with these chronic, or senile herniæ, pathological changes have wrought such a radical alteration in the position, consistence, and relation of the gross structures and the minute histological elements, that we need hold out no hope for a cure by radical operation; as the most which we may expect to accomplish is the comfortable reposition of the parts in such a manner that they may be painlessly and securely retained by a prothetic support after operation. As the greater part of these cases are complicated with spermatocele or hydrocele, and are irreducibly incarcerated, besides, as their abode has been so long in an accessory cavity, their sudden and complete return may react mortally on the respiratory organs. When, however, strangulation may threaten, or for other reasons an operation is decided on, having a full appreciation of the conditions before us, the question may arise as to whether or not it may be as well to cut at once down on the broad, thick neck of the sac. If it contains mesentery and intestine, cautiously isolate and reduce as in the case of bubonocoele, and if we should meet with a mass of adherent omentum, free it well above from the inner surface of the infundibulum; make traction on its proximal pedicle, so that on division the ligated stump may mount high in the abdominal cavity and leave the mass of the epiplocele outside in the scrotum where it was. There is no danger of a slough, for its nutrition is rather from its adventitious connections, than the linear vessels which course

downward through the pedicle. This procedure has answered admirably in three cases in my hands. One was a woman, and two men. It spares an immense effusion of blood through capillary oozing, attendant on decortication; and the undisturbed parts below give rise to no further annoyance. With this hernia the sac must be carefully closed with strong silk in divided sutures, and to my mind it is the only hernia in which the vivifying and solid suturing of the pillars is a judicious or useful procedure. It would be absurd to suppose that this immense open chasm, only covered in by the peritoneum and integument, could resist the re-descent of the extrusion. Hence, the pillars must be brought together and firmly closed with silver-wire sutures. It is true that these may later give rise to irritation, but occasionally, as when buried in the fibro-osseous tissues of the patella, unless they cut through, by lateral tension, they may remain imbedded in the tissues almost indefinitely; but of this more later.

DIRECT INGUINAL HERNIA.

This form of hernia is said to be more common in women, and to occur about once in five of all the inguinal cases. This is the figure as given by Cloquet.* My own observations convince me that these statistics are erroneous, as I have never met with but two cases, which by any stretch of the imagination could be regarded as of this type. On the contrary, even with these I had my doubts, as the parts through lapse of time and interstitial changes had so altered that it was quite impossible to say just precisely the type we had before us. It appears of late years that surgeons, or those whose province it is to deal with the morbid anatomy of hernia, quite generally ignore *direct inguinal hernia* as a pathological entity; for in none of the latest and most complete works on hernia, by American and foreign authors, is it at all barely mentioned. And with American surgeons the confusing, cumbersome nomenclature of Cloquet or Gray is rarely adopted in their descriptions of hernial coverings.

The intercolumnar fascia may be very thick, or the conjoined tendon very thin, so that in a general collapse of all the aponeurotic coverings of the inguinal region, the isolation and recognition

* Cloquet, Anatomies des Hernies.

of these independent structures will often be quite out of the question. Fortunately, in the surgical therapy it will, in any event, in no way effect technique.

For we will deal with the pouch of the conjoined tendon precisely as we do the intercolumnar fascia. The essentials in operation, then, are practically, identically the same in direct inguinal as in large, ancient indirect.

3D.—CASES IN WHICH URGENCY DEMANDS HASTE IN OPERATING.

Probably we can conceive of nothing in life which to a greater degree is an unknown quantity than a surgical operation. The way may seem clear of every possible obstacle or accident; the patient's general condition is excellent, and everything points to consummate success at every step. We have studied our case; have over and over examined the field, and, mentally, have repeatedly gone through all the stages of an operation; provided ample assistants, and anticipated, we imagine, all possible emergencies. But from the start everything goes wrong. It may be quite impossible to narcotize, or our patient may have violent, uncontrollable muscular spasm. He may have incessant vomiting, a suffocative, respiration, or heart failure. Besides, at a time we need light the most, it is the worst. Our patient may be a *bleeder*, etc. All or any of which may necessitate the bringing of an operation—particularly one which involves the peritoneum—to a hasty close.

Under these circumstances, although it may be desirable to enucleate the sac, yet the operative procedures may be simplified and shortened by the simple division of the neck of it, in the manner as previously described. In extremes of age and those suspected of organic disease, the reduction of the operative time is of great importance. Under these circumstances and in the class of cases here described as appropriate, cervicotomy may be utilized instead of another operation which entails a tedious and difficult technique.

Championnière attaches great importance to the necessity of *full* anæsthesia before we commence any sort of hernial operation, and rigorously excludes those afflicted with asthma and bronchitis. And Félizét, invariably as a prerequisite in herniated children,

insists that they should have passed through measles and whooping-cough before any operation is undertaken on them; and for the same reason, fearing bronchial troubles in winter, prefers the warm weather of summer for herniotomies performed with a view of radical cure.

SECOND DIVISION.

THOSE OPERATIONS IN WHICH THE SAC IS COMPLETELY DISSECTED AND CUT AWAY AFTER THE INGUINAL CANAL HAS BEEN DIVIDED THROUGHOUT ITS ENTIRE LENGTH; AFTER WHICH, THE CANAL, EXTERNAL RING, FASCIA AND INTEGUMENTS ARE CLOSED, LAYER BY LAYER.—(CHAMPIONNIÉRE.)

This is the operation which Championnière has performed on 274 patients, with slight modifications, on children and adults, males and females, in strangulated and non-strangulated hernia. His mortality in the non-strangulated, non-complicated, was practically nothing. He has reported but few relapses, though it would seem from his writings, that he had not put his cases to an ordinary test, for he always required his patients to immediately wear a broad belt, with a metallic plate applied, immediately over the traumatized area. It practically serves the purpose of a truss, though it acts on a somewhat different principle. He recommends it indiscriminately after all radical cures, though it is not quite clear, whether it was to be worn continuously through life or not. Many are reported to have laid it aside after a time, without relapses.

This is essentially the same operation as first practiced by Reverdin; only the former always extirpated the sac, something which the distinguished Belgian sometimes omitted.

Before detailing the various steps in this operation, it is well to fully appreciate the possible and probable results, which may ultimately result from the extensive dissection and mutilation, which this operation renders imperative, when performed on a complete, indirect inguinal her-



FIG. 45.
Championnière Belt and Support,
worn after operation.

nia on the male, on the lines laid down by its originator.

First, the sac, the peritoneum, the cellular membrane, and infundibuliform layer of the fascia-transversalis, which is not, as many anatomists teach, either anterior or posterior to the spermatic, but in nearly all cases of reducible and incarcerated herniæ rather thrown in among the strandlike structure of the cord, so that, as we endeavor to roll out the sac, we must begin by endeavoring to enucleate them with the finger-nail and scalpel, which we may, perhaps, accomplish in many; but in not a few, this *debridement* or detachment, without doing irretrievable damage to the neural or vascular structures, is quite impossible. As one comes on the sac and finds it encased in those linear, cordlike channels, on their way to or from the testis, there are none of them which can be definitely distinguished, except the artery of the testis, the pulsations of which may be felt, and the thick, resistant sperm duct of the same organ. It is quite impossible to recognize

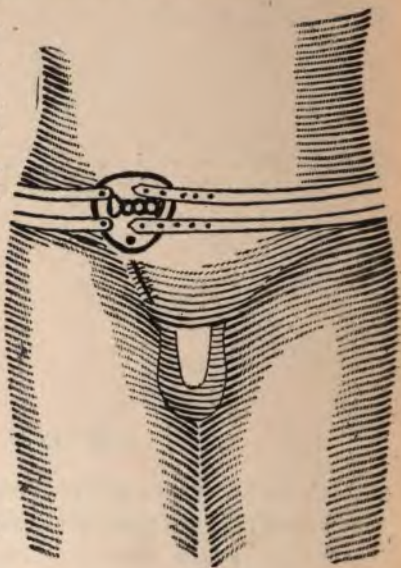


FIG. 46.
(Championnière.)

the veins, when not varicosed; the cremasteric, or artery, of the vas deferens, as is also the spermatic nerve, and other branches from the external pudic and obturator, which must be encountered on the way to the base of the scrotum. Hence, in the tearing, teasing and picking which must be done, to divest the peritoneal pouch from those elements which belong to the cord and testicle, extreme care must be observed. This step of the operation is always attended with more or less loss of blood, and laceration of nerve filaments. But the sac is finally freed; though we may have had to go down and peel it off the testis itself, as was done in one of my own cases in a congenital hernia.



FIG. 47.

Three independent layers of sutures after incision of the sac; inclosing incision.

And let it be noted here that the fibrous elements of the sac possess great contractile power, a proof of which we always observe. For, while before reduction of the hernia the sac may be distended as large or larger than the fist, when empty its volume is no larger than the finger, or is even less at times. The scrotal adhesions being liberated, the cremasteric and intercolumnar fasciæ being laid widely open, we arrive at the external ring. Here it is well to hesitate a moment and recall a few points in the anatomy of the inguinal passage. As has been pointed out under a description of structure and function elsewhere, the external ring is *normally* widely open; the canal from without, inward, taking the form of an inverted cone;

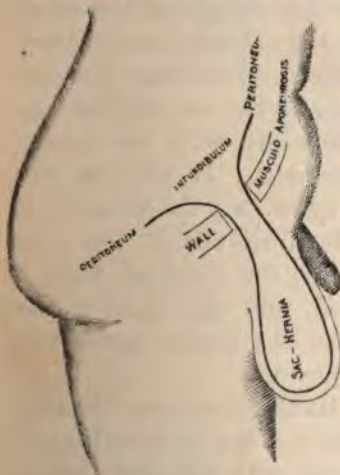


FIG. 48.

Diagram indicating the peritoneal pouch, which must wholly disappear on operation for radical cure. (Champlonnière.)

the base of which corresponds with the pillars or the borders of the conjoined tendon and the upper border of Poupart's ligament.

Invaginating the integuments we can conveniently pass the finger along the entire length of the inguinal canal, which pursues an oblique direction to the internal ring, so miscalled, for there is no analogy whatever in the structural arrangement of either ring. As the finger is in the canal we will note, that as the abdominal contents were directly against the abdominal walls, their advance is opposed by the obliquity of this canal, which, the greater the resistance from within, the more closely it is closed, and next the canal itself, which is essentially a hollowed tube, having two distinct walls, the outer of which is composed of more muscular tissue than the inner. As we advance up the canal, it will be noted that the inner wall becomes thinner, and the outer more dense and muscular.

Now, in following up the sac with the scalpel to the internal ring, all this delicate architecture is seriously deranged, if not for all time destroyed.

An incision is made through the entire length of the canal, from the external to the internal aperture, in order that the pedicle of the sac may be ligated on a level with the general peritoneum. It will be seen that by this act the obliquity of the inguinal slit is lost; the anterior, the thickest wall, is opened, and the canal is destroyed as a barrier against ventral pressure.

Having cut away the neck of the sac, the proximal lumen is closed with the chain suture (see Fig. No. 49), and returned

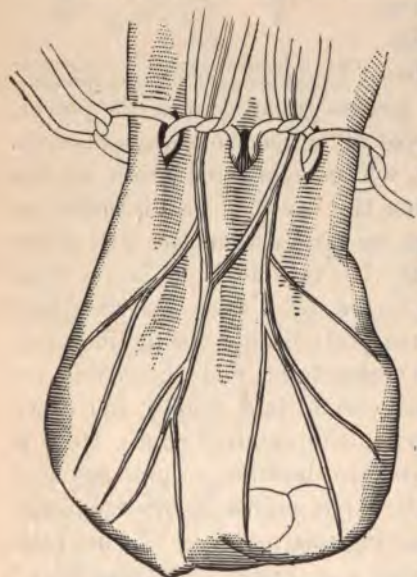


FIG. 49.
Adjustment of the chain suture before division
of the neck. (Championnière.)

when the parts are closed in by three layers of cat-gut sutures, and the external ring is closed with the same material. The late

lamented Parkes, of Chicago, at the American Surgical Congress of 1888, declared that the suturing of the pillars was of no value as a prophylactic, as he had seen the walls expand, and relapse occur as frequently when they were sutured as when they were not. Reverdin later expressed similar sentiments. When relapse or recidivation does follow after the operation, as the canal is gone, we must have practically a ventral hernia; a phase of the infirmity at once the most intractable and unmanageable, as now the the escaping viscera wander in any direction offering the least resistance, intruding themselves in the intermuscular spaces and subcutaneous tissues, acquiring adhesions and becoming in time incarcerated and irreducible.



FIG. 50.
Proximal pedicle after ligation and division.

In crural, umbilical or ventral hernia this operation, when the sac is devoid of adhesions, is the ideal. In the inguinal hernia of the female, in whom the external ring is large and the passage very short, and in whose inguinal canal there are no important structures analogous in function to those met with in the male, it no doubt may have a place, and serve a useful purpose in a considerable number of cases. As the incision with them to expose the canal will be near the median line, the hair of the mons veneris will often effectually conceal the scar.

THIRD DIVISION.

AN OPEN OPERATION WHICH ESSENTIALLY EMBRACES THE SAME STEPS AS THE PRECEDING, BUT THE DIVIDED INGUINAL CANAL AND THE SOFT PARTS UNITE BY GRANULATION TISSUE INSTEAD OF PRIMARY UNION.
—MCBURNEY.

Although this operation was first practiced by Langenbeck, it was more fully elaborated and instituted on an extensive scale by Dr. Charles McBurney, of New York.

The fundamental objects claimed to be obtained by this "open operation" are the complete isolation of the sac on the same plane as the general peritoneum, and the filling in the breach in the tissues, made by the scalpel, with cicatricial tissue. McBurney claimed for the operation that it prevented any dimpling or funneling of the peritoneum, and hence the tendency to relapse, so common after all those operations which left a remnant of the sac in the canal. It was also maintained that the resulting ridge of scar tissue would serve as an efficient barrier against relapse. Of course this procedure would scarcely apply in any other than in typical inguinal hernia, for it presupposes the presence of a sac, a canal, etc.; hence in a

sacless hernia, in direct inguinal, infantile crural, it is not so practicable, or in umbilical. If other operators have aimed at curing hernia by stuffing the canal or closing its lumen, the New York surgeon proceeded in a diametrically opposite direction to accomplish the same end, as every vestige of the sac is swept away, the inguinal canal is opened from end to end, and deliberately kept so by sewing its divided edges above and below to the integument; and packing the interspace, through which the spermatic cord passes, with a tamponade of gauze.

Dr. McBurney reports a very large number of cases treated by this plan, nearly, if not all, for the non-strangulated. My own six cases in which this operation was employed for strangulated, as a radical measure, reported in the *Journal of American Medical Association*, for June 17th, 1889, were the first in this country in which it had been utilized for this phase.

Inasmuch as it afforded the surgeon every facility for manipulation and provided for ample drainage, it at first favorably impressed me as being specially adapted for strangulated cases.

This operation *par excellence* demonstrates the marvelous resisting power of the peritoneum; for, exclusive of it and the conjoined tendon, there is nothing to hold back the contents of the abdomen until cicatrization is complete. The obliquity of the canal is not only destroyed, but the canal itself, with its coverings as well; so that in the event of relapse the hernia is only prevented from coming directly into space by the cicatrix. If this should rupture or sunder we would have precisely the same phenomena as we sometimes witness spontaneously occur in exomphaceles, when the umbilical scar spreads out as thinly as tissue-paper, erodes or bursts and allows the intestine to pass directly through.

Soon after Dr. McBurney's thesis on the technique of his operation at the New York Academy of Medicine, Dr. William T. Bull made a vehement attack on all sorts of radical operations for reducible coercible hernia. McBurney's operation came in for a large share of his condemnation. This, he said, was conceived on vicious principles, and was based on views of reparative processes not in accord with the sound tenets of pathological changes, etc., that relapses must be inevitable, and when they did occur, they must be quite unmanageable.

Dr. James E. Kelly, of Charity Hospital visiting staff, however, reported several cases treated after this plan, and reported good results as to permanency of cure of the hernia, but mentioned that the cicatricial pressure on the cord had produced, in some cases, very painful sensations when the patient stood long. It does not appear that this operation has been very generally adopted.

Although in my own hands it yielded quite good results in strangulated cases, the few relapses after it, which did occur, were of a most intractable character, which almost no truss could comfortably retain.

If we can depend on cicatricial tissue to permanently replace muscle and tendon, then, indeed, this operation offers many advantages, and might be utilized with benefit for those not belonging to the laboring classes. But we do know that the tendency of proliferation of connective tissue cells is always in the direction of resorption and condensation, and that scar tissue possesses neither the strength nor pliancy of a muscular sac; but that, on the contrary, when it finally ultimately undergoes complete fibrinous changes, and parts with its vascularity, it acquires a brittleness and fragility unable to withstand a sudden strain. The author of this procedure insists on it that a truss must not be worn after operation. In Championnière's operation the same rule is prescribed. But in contradiction of this injunction the Parisian surgeon insists that a *ceinture*, an encircling belt, with concave plate, must be immediately adjusted, and constantly employed as a prophylactic against relapse. Although it is denied that this is constructed on the same principles as the truss, or serves a similar purpose, its close analogy is too apparent to be regarded in any other light than a mechanical appliance, which serves essentially the same purpose.

Dr. Bull, in his tirade against hernial operations, ridiculed the pretensions to radical cure when a truss must be applied on taking the upright position, and sarcastically remarked, that those only who were well trussed up could make any claim to be cured. Abbé, Wyeth, Weir, and others, who have performed the McBurney, have advised the application of a light truss. In all my own cases I have taken the same precaution. In my first cases, in which I omitted it, relapse appeared early. Perhaps, when the

precise technique of McBurney is better understood and applied, we may dispense with this support after operation. Nevertheless, whether it, or any other surgical operation, effects a closure of the opening, a tendency to relapse will always remain here, which requires a support; and, besides, as a hernia is so apt to occur on the other sound side, after one portal is plugged in a large hernia, a double truss should be worn in the absence of a firm bandage.

FOURTH DIVISION.

COMPLETE DETACHMENT OF THE SAC FROM ITS ADHESIONS, AND ITS SUBSEQUENT UTILIZATION AS A PLUG, TO SERVE AS A BARRIER AGAINST RELAPSE.—MCEWEN-KOCHERS.

The preservation and utilization of the sac as a tampon, we have seen in the historical part of this contribution, is a very ancient procedure, and belongs, with anchorage of the testis, ovary, omentum, or intestine, to those procedures which might be designated "obturation of the canal by autoplasmic implantation."

Dr. Wm. McEwen, of Glasgow, has recently revived and modified the operation. He has reported a considerable number treated by peritoneal occlusion, in which there have been, as far as he could learn, but few relapses.

The operation, however, has not met with very much favor, and is not now as extensively practiced as it was when first introduced. Reisel in 1877 performed an operation quite similar to this. He dissected the sac away, and then, by invagination, pressed it up to the internal ring, and sutured it in the canal with catgut. With what result is not stated.

The operation of McEwen, which may be excellent in its results when all the conditions are present to favor its success, is, nevertheless, in a general way, opposed by all orthodox principles in surgery. Independent of the necessary amount of tearing and laceration inseparably connected with the decortication of an old adherent sac, and impacting a foreign, heterogeneous mass in the canal, when the cardinal aim in all hernial surgery is to restore normal relations and clear the passages of such substances as may favor, by their presence and irritation, the re-establishment of a condition which an operation is undertaken to remedy.

This procedure has no place as an adjuvant to kelotomy for strangulation—a condition in which, alone, the sac is usually free from adhesions—for the investing peritoneal pouch in these cases is often more or less necrotic, as the result of inflammatory or other degenerative changes, which make its extirpation necessary. Then it often must be left free in the breach to contract or close in by granulation, if not exsected. As the nutrition is provided, in all cases of adherent sacs, largely by the vascular supply through the perihernial tissues, when this is totally cut off, as it always is in enucleation, the sac may undergo rapid atrophic or ulcerative processes and disappear; hence, in a short time leaving the canal about the same as though nothing had been done to obturate it.

The varying capacity and consistence of the sac may be an embarrassing feature in a given case, as we will sometimes find this very large, thick, and tough, so that its gross volume is very much in excess of what we require or can utilize; while, again, it is very diminutive and of a gauzelike thinness, so that it breaks down on even very moderate manipulation, and there is so little of it as to render it quite useless as a plant in the inguinal tract.

This operation, without modification, certainly cannot be utilized in the congenital type of hernia, or in a monorchis, in whom it is important that the inguinal canal be preserved clear of every impediment.

In properly selected cases, with the young in sound health, and in uncomplicated inguinal hernia, particularly the female type, keeping the conservative aim in view of sacrificing nothing, but utilizing everything, we must admit that this operation may be

applied with advantage. Dr. McEwen has personally informed me that this operation was not indiscriminately recommended for every phase of hernia, and had his sanction only in appropriate cases.

In it, as in others already described, the pillars of the rings are approximated and sutured, after the wad of peritoneal tissue is turned on itself and imbedded in the canal. This step, in the event of the implanted sac undergoing homologous assimilation, can certainly serve no useful purpose; while, on the contrary, should this fail, and permanent obliteration of the hernial operation follow, we would have still, anatomically, an incomplete hernia resulting, with all the discomforts and ultimate dangers which might ensue.

When, then, this species of peritoneal grafting, to fill in "dead spaces" or to wall back hernial re-descent, is resorted to, as much or more may be accomplished by leaving the external orifice open and dependent.

McEwen, from 1879 to 1890, operated sixty-four times; five being crural hernia, seeing but one unfavorable result.

FIFTH DIVISION.

ISOLATION OF THE SAC, WITH SECTION AT THE INTERNAL RING ;
SPLITTING THE INTERNAL RING, AND LIFTING THE SPERMATIC CORD
ENTIRELY OUT OF THE RINGS AND CANAL, AND THEN OBLITERATING
THEM TOTALLY BY TENDINOUS APPROXIMATION.—BASSINI.

The presence of the spermatic cord, the round ligament of the testis, has always been regarded as an insurmountable barrier to the radical cure of inguinal hernia ; and, accordingly, different operators, since very early times, have either resorted to castration while herniotomizing or else endeavored to destroy the spermatic channel, from end to end, by displacement of the cord.

Most certainly, when this operation, as performed by Bassini, of Padua, is carried out in all its details, we can never again have a relapse of an inguinal hernia, for by it every remnant of the *inguinal* architecture has been swept away ; and, surely, we cannot have a hernia through a structure or parts which no longer exist. But we may inquire, can the spermatic cord be raised and transported without traction on the slack below, or without further weakening the abdominal wall, in making another breach through sound parts ?

The tubular structures of which the cord consists, each approach the internal orifice at different angles, from different directions, and only converge and follow the same plane as they emerge from the abdominal wall externally. The cord is protected throughout by a peritoneal investment, which though above it is sealed, is yet, nevertheless, continuous with the cavity of the peritoneum. We cannot, therefore, raise the cord from within the abdomen, for there none exists, and hence, in order to displace it, dangerous traction must be made on those delicate elements of it, which, at the internal ring, have effected a permanent lodgment. Besides, as it is only free from the outside of the ring, this is the part which must be raised and placed into the gap made in the abdominal wall to receive it.

The displacement of the cord by raising a loop of it into the slit in the tissues, causes a double incurvation of it, so that in its new situation it takes the shape of the letter S. And hence this double curve, with the contractile compression liable to ensue as the soft parts close in around it, are physical causes which one would think would, in time, cause grave functional and organic disturbances in the vessels of the cord and testis. However, if these cause no changes other than a painless atrophy, as one testicle is ample for the preservation of virility, this is a sequela of little consequence, and our patient would be left a whole man, as

far as appearances went. This effort of preservation of the testis in hernial operation by the surgeon is always appreciated by the laity. Curling, in his treatise on "Diseases of the Testicle," cites an instance in which a distinguished French surgeon was murdered by a patient from whom he had removed a testicle.

In the case of an old, painful, incarcerated hernia, in a clergyman of middle age, in whom I was invited to do the radical operation by Dr. Frederick G. Kneer, of this city, when I explained to the gentleman

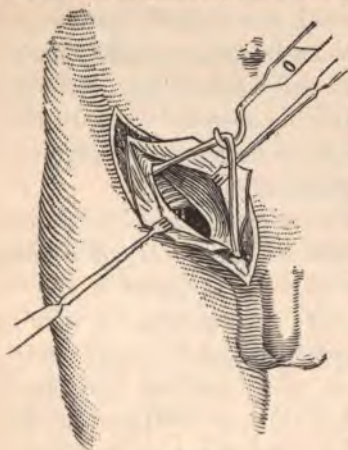


FIG. 51.
First stage in Bassini's operation.

that when I exposed the parts by a deep incision, I might find it necessary to sacrifice the testicle on that side, he vehemently protested against it, that it would unsex him, and impair his manhood. Bassini's operation is intended to always obviate the necessity of castration.

The next step in this operation, after the cord is fixed in the new opening, is to close the canal, bringing the divided end above and sewing it into the upper border of Poupart's ligament, thereby completely and solidly closing both rings and the canal, after which the cord is carried outside the deep fascia or fascia lata, and covered in with the superficial fascia and integument.

If the cicatricial bond which closes in the largest rent in the tissues could be depended on, this should be one of the most radically curative of all operations. If some sort of non-corrosive material could be found which could be left imbedded in the tissues to permanently lock the gaping edges together, and should the reparative material provided by the economy prove adequate, our patient might be fairly guarded against return of his hernia.

In Rome I was permitted the privilege of witnessing Prof. Leoni and Dr. Raphael Bastianelli perform several hernial operations in the surgical hospital of the Via Corsa by this method. They employed silk suture for the tendinous structures, as they said that any sort of absorbable material could not be trusted, for it gave way before solid union was effected. They always employed vigorous antiseptics, and had practically no mortality which could be attributed to the hernial operations. Dr. S. E. Milliken, of New York, has largely employed this operation, and speaks well of the results.

My own observations of its technique, and a study of the principles on which its claims rest, have led me to take a decided position against it. No doubt it has given many operative suc-

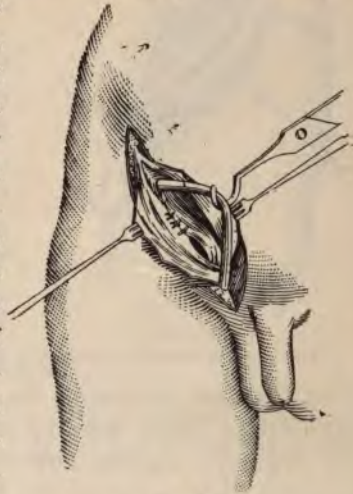


FIG. 52.

Second stage in Bassini's operation.

cesses, but in the event of relapse the succeeding hernia must be quite unmanageable. Bassini reported 251 cases of reducible inguinal hernia operated on by him, in which he says there were but seven recurrences, though 198 of these cases passed from under his observation within six months and a year after operation.



FIG. 53.

Third stage in Bassini's operation.

tions, they are imputable to antecedent conditions which would have cut off life if nothing had been done.

Ségon's* figures, however, do not bear out this view. He collected 219 cases up to 1880 with 20 deaths, or nearly a mortality of 10 per cent. The same author, in 113 cases, in which the results were published, found that 44 of them almost immediately relapsed. Schede, Reisel, Weinlechner, Reverdin, Czerny, Esmarch, and McEwen have each reported *post-mortem* demonstrations of the perfection of curative consolidation by their various operations. Maas, of Fribourg, examined, after varying intervals, his own and Czerny's cases, and reported that they all had relapsed.

Schede, Czerny, Socin, Tilanus, Langenbeck, Reverdin and others, ridiculed the pretensions of those surgeons who never admitted relapses. Juillard candidly admitted that in his 22 operations for radical cure he had had but *one* permanent cure. In this case he found it necessary to resect 18 centimeters of the intestine. After she recovered from operation, she had mental alienation, though two years after there was evidence of relapse of the hernia.

* Cure Radicale des Hernies, page 206.

CHAPTER XX.

MISCELLANEOUS OPEN OPERATIONS IN INGUINAL HERNIA AND THOSE APPROPRIATE FOR STRANGULATION; FOR FEMORAL, UMBILICAL AND OTHER VARIETIES OF HERNIA.

In the recent "System of American Surgery" (Diseases and Operations of the Abdomen, p. 177), an author says, "Many operations have been devised for the cure of hernia, which have for a time been popular, and then forgotten, or have fallen into disuse. The operations of Wood and Wutzer are never practiced now, as these since the introduction of aseptic surgery have been entirely superseded by that of the open incision."

This statement is practically correct; though the operations of Gerdy, Wutzer and Wood in modified ways are yet being performed, as is seen by Bennett's operations. And, it might be added, that "open operations" for reducible hernia in America during the past two years are decidedly on the wane.

To enter into a full and detailed description of the almost endless variations in the "open operations" would occupy a considerable space, and as the principles which underlie them all

are fundamentally identical, no effort will be made to describe them here.

It may be said, however, that in different cases no precise technique will answer for all, and that the operator must accommodate his dissection to the manifold phases of the infirmity presenting in divers cases. Probably, if every surgeon would publish as

his operation; one, who when he found it necessary to so far deviate from the usual course and resort to a novel expedient to accomplish his purpose, the names of operations for radical cure would occupy a very long list. For instance, in one of my own cases in which I had a very thick stalk of omental tissue, after securing separately its vessels, and cutting off the main mass, I passed a strong curved needle through the inner pillar of the ring (for there was but one ring), through the mass underneath, and out through the opposite pillar. I then re-introduced the needle at a point a full half inch below, and returned it in the same direction until it came out a little distance from where it entered, when I firmly twisted the free ends and turned them in, covering in the parts by sewing the fascia and integuments in-



FIG. 54.

Congenital Hernia before the operation.
(Félizet.)

dependently. This was a good case to test this plan on, as he had been operated on before for radical cure, with a prompt relapse. He was a hod-carrier, and now, after three years, there has been no trace of relapse. I have since seen practically the same operation performed in London by Dr. Barker. In another case of a child with an enormous ring and no inguinal canal, I have solidly sealed in the breach, employing large harelip pins, which penetrated the integuments on either side, using silk suture over the pins. I left three of them in for three weeks.

The gave rise to no irritation and served a most admirable purpose.

No doubt many others have employed similar devices to accomplish the same end. In *open operations* for congenital hernia, where there is no independent serous investment, we must utilize the spermatic fascia.

In multiple hernia on the same side, direct, indirect, or inguino-femoral in encysted or neoplastic, a special and peculiar technique is required for each; hence, no formal operation will answer for all species, or but a very few simple types of them. Hence, it would be preposterous to allege that a specific procedure must be devised for each.

Accordingly, this part of the subject will be closed with a few notes on two or three operations recently recommended. One is by Félizét, which applies particularly to children's inguinal hernia, and another one will be given in full, because it is the very latest procedure devised up to date for *radical cure* by the open incision. The latter is by Theodore Kocher, of Berne.

Félizét's operation in no way differs from all ordinary inguinal operations, which require the enucleation of the sac and its severance at the neck. It is unlike these operations only in technique.

In this operation an incision is at once made down to and through the sac, into which a sort of oblong bag is inserted and is then inflated. (Fig. 55.)

The author designates this a *ballon* or balloon. Having been inserted, an inflating tube is connected with a stop-valve, and blown into until it is fairly distended, when the blow-pipe is disconnected and the operation of decorticating the sac is commenced.

The advantages which the Parisian surgeon claims for this device is that the empty sac, after the viscera are reduced, is rendered tense, so that the work of enucleation of the elements of the cord and adjacent tunics is more safely and expeditiously performed.

As there is a firm resisting surface to cut



FIG. 55.
(Félizét.)

on, and besides the red color of the gold-beater skin gives such a tint through the gauze-like overlying tissues, one can easily escape doing damage to the spermatic vessels.

In fact, it is said that the operation time is reduced one half or more.

In spite of its apparent advantages, nevertheless but few surgeons have utilized it, claiming that its introduction in itself was not without danger to life, and that in many cases its employment would be quite impracticable. The danger of infecting the peritoneum by introducing this foreign body into the caudal protrusion of it was alleged against it. The inequality of capacity and want of uniformity and contour in the hernial sacs, besides scattered adhesions within them, rendered its use quite impossible and undesirable in a considerable number of cases. Félizét had the most happy results following its employment.



FIG. 56.
(Félizét.)

As it, however, must demand some

special practice on the cadaver before it can be readily adopted in average cases, it has failed of that success which was hoped for it.

In the "Annals of Surgery," for December, 1892, there appears yet another new open operation for radical cure of hernia, invented by Kocher, which the author claims has no analogue in surgical literature. That this assumption cannot be supported, is abundantly demonstrated to anyone who critically examines the plates and description of the operation, which are here given unchanged, as it comes from the pen of the translator.

"We wish to describe a new procedure for the radical operation for hernia, which we perfected, and, after sufficient study, performed upon a series of cases and demonstrated before a number of surgeons. For it appears from the not yet completed observations of

our final results by Dr. Leuw, that the method which we had employed has not fulfilled all of our cherished hopes. We have already explained to what degree this view has been modified. This procedure, which, in the literature known to us, has no analogue, is best explained by the accompanying cuts, which were made after drawings by drawing-master Kiener, taken from nature during one of our operations. The method suffices to make tense the peritoneum in the region of the inguinal canal, and to fix it

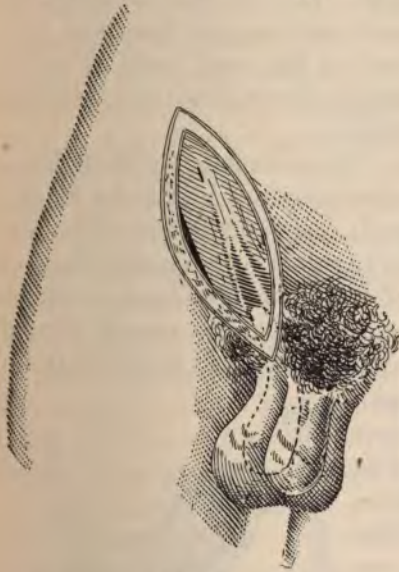


FIG. 57.

The primary incision in Kocher's method for the radical cure of hernia.

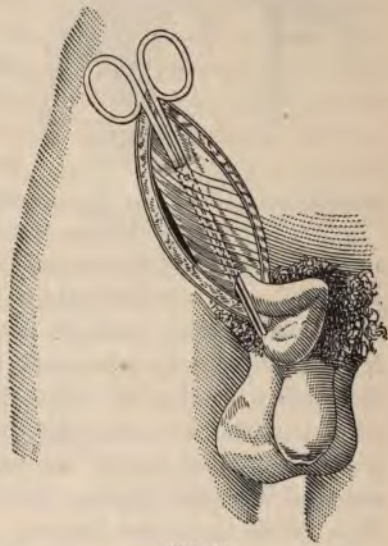


FIG. 58.

Forceps introduced along inguinal canal and grasping the sac at its lower end.

against the anterior abdominal wall. This is accomplished after the same manner as in the methods of Barker, Ball, and McEwen, with the difference that the stretching of the peritoneum is done in a direction opposite to the direction of the inguinal canal and the course of the hernia; and that the fixation of the peritoneum is done much more firmly, and in a more permanent manner.

The skin and superficial fascia are divided over the inguinal canal and laterally outward in the direction of Poupart's ligament (Fig. 57), and the sup. epigastric artery ligated. At the anterior inguinal ring only the thin fascia of Cooper, which, as

a continuation of the tense aponeurosis of the external oblique muscle, covers the spermatic cord, the cremasteric loops and the tunica vaginalis communis, which is especially well developed in hernia, are also divided. The structures of the spermatic cord are now separated, in which, by holding them towards the light, the border of a very thin hernial sac can be recognized. This is then carefully dissected and isolated from the structures of the cord until it can be strongly drawn down and its pedicle exposed.

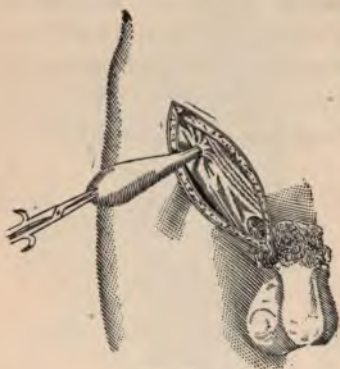


FIG. 59.
Sac drawn out through lateral opening in external oblique aponeurosis.

The index finger of the left-hand is now introduced into the inguinal canal; and laterally from the posterior inguinal ring, a small opening is made through the aponeurosis of the external oblique muscle (see Fig. 60). A slender pair of artery forceps is passed through this opening and through the lower muscular fibers of the internal oblique and transversalis muscles, following the left index-finger as it is withdrawn through the inguinal canal and finally out of the external inguinal opening (see Fig. 58). With these the isolated hernial sac is grasped and drawn through the inguinal canal and through the narrow opening in its anterior wall—that is, in a lateral direction from its upper end.

The hernial sac now hangs through a narrow opening above Poupart's ligament (Fig. 59.). It is drawn out as much as possible, and then, as Heliodorus did, and as Ball has recently advised, it is energetically twisted. The sac is, however, not removed, but strongly drawn down and laid over the

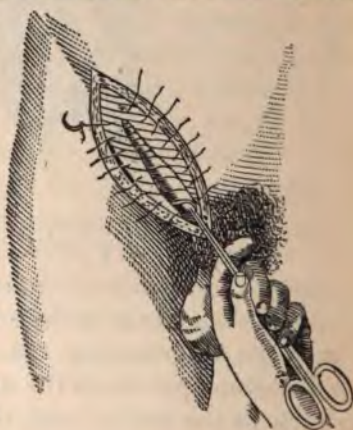


FIG. 60.
Sac twisted and laid down external to the aponeurosis covering the inguinal canal.

outer surface of the aponeurosis of the external oblique muscle against the external inguinal ring, and in the direction of the inguinal canal (Fig. 60).

By this tension on the sac, as is shown in Fig. 60, the anterior wall of the unopened inguinal canal, and especially the tense aponeurosis of the external oblique muscle, are pressed inward and backward into a gutter.

As the twisted sac lies tensely stretched in this manner, beginning at the upper and outer extremity, deep sutures are applied. The sutures are passed above the twisted sac, through the oblique fibers of the aponeurosis of the external oblique muscle and the underlying muscle fibers of the external oblique and transversalis, through the hernial sac itself and including the ligament of Poupart beneath it. These sutures—five to seven or more—bring together also the pillars of the anterior ring, to which the lower end of the hernial sac is fastened. In case of a long sac, all that extends below the external ring is cut away.

In this manner a firm and solid pad or roll is secured over the entire length of the inguinal canal, which forms a better dam against the pressure of the intestines than an implanted patch of skin or periosteum. Furthermore, the peritoneum is drawn laterally on the stretch and firmly pressed to the abdominal wall in the region of the posterior inguinal ring, where it is held by the torsion of the sac and the deep sutures. The operation is more certain when the upper suture can be deeply applied laterally from the place of entrance of the spermatic cord into the abdominal wall.

We have employed the same method in cases of femoral hernia in this manner. The sac, having been completely isolated and twisted as strongly as possible, is drawn through a small opening above Poupart's ligament, and, in the manner above described, included in the sutures which are passed through the pectineal fascia and Poupart's ligament for the purpose of closing the femoral ring.

This, the latest fruit of an ingenious mind, and a distinguished surgeon, combines the steps of various operators. It embraces essentially nothing original, and is based on principles totally at variance with sound surgical doctrines; for of all the open opera

tions, so far recommended and practiced, this one must be particularly proscribed, as it possesses all the weak points which surgeons have criticised in others without any of their redeeming features.

The time has come when surgeons should "speak out," and let their blows fall where they will, when new procedures are submitted to them for their approval or rejection.

The contributions of this distinguished German surgeon, heretofore, have been numerous and valuable, but as to this last essay on a new operation, it must be said that the cases which require or justify its performance must be few and rare.

It will be seen by the cuts that the first step is to make a free incision over the internal inguinal district to the base of the scrotum, in all complete inguinal hernia. The second requires the division of all the coverings, down to the sac, until the outer ring is wholly freed, when the sac is entirely detached and hangs free. The third step includes an opening through the external and internal oblique muscles, down to the internal ring, when the wall is again weakened by the division of the entire canal. The third and last step is seizing the sac, now free to the internal ring, and twisting it into a spindle, then transfixing it with interrupted sutures, and firmly closing in all the outer wall of canal and sac by securing the sutures, and closing the incision in the integument.

The fundamental objections to this operation, are: 1st. The enucleation of the sac in old, incarcerated hernia; 2d, The division of the entire anterior wall of the canal; 3d. The imbedding of the sac in the inguinal canal, for the reason that it is a foreign body, cut off from its former peripheral circulation, and being submitted to severe torsion, twelve twists, is almost certain to either slough or atrophy, and in no way, under the most favorable circumstances, possibly compensate for the extensive mutilation, which its transportation to its new abode must entail. Perhaps, after all, these objections to this and other kindred open operations, the effects of which have been to secure a homologous tamponing of the abdominal apertures, may be and are rather visionary than practical, for it appears from recent writers that bone cavities may be safely and hermetically plugged with dead bone, sterilized cotton, or iodoform gauze.

Perhaps the next thing we will hear of will be a silver plate, or hard rubber plaque, to seal a hernial aperture, as was once done with shot holes through the cranial vault.

Lawson Tait's operation for the radical cure of hernia deserves something more than passing notice, not so much because it possesses any practical value, as that it emanates from the brain of one who has been an epoch-maker and a breaker of new ground. The procedure, like most of Tait's best work, is strikingly bold, and decidedly original. Recognizing the basic principle that nothing in the way of cure can be accomplished in open operations for hernia, without opening the peritoneal cavity, this giant mind conceived the idea of doing the laparotomy at some distance away from the inguinal district, thus obviating the resulting weakness which follows so frequently these modern cutting operations over the rings. Another new principle was added, in *drawing up* the hernia from the *inside*, instead of *pushing it* from *without*, and applying the sutures and closing the ring from within. The author acknowledged that he had never employed this new plan on any cases, except those on whom he had performed a laparotomy for an abdominal disease, in whom, when a hernia was present, he always utilized the occasion to withdraw it into the abdomen, yet he would advise it for all ordinary and strangulated hernia.

Tait's essay presented at the annual meeting of the British Medical Association, at Bournemouth, in 1891, did not receive the support of his fellow-surgeons. It cannot be said that the operation is impracticable, but there are such formidable objections to it that it is under special and peculiar circumstances only that it is at all permissible.

The opening of the cavity of the general peritoneum is always attended with danger to life, and is liable to be followed by ventral hernia at the site of the scar. Could these objections be overcome, yet no guarantee can be given that the hernia will not return at its former site.

If Mr. Tait or some other surgeon can show us how the *visceral* fault can be eliminated in hernia by a surgical operation through the abdominal walls, which will not seriously imperil life, a great gain will have been made. For with all our modern operations, the mural element alone is dealt with; while the prime ætiological

factors of intra-abdominal capacity and [pressure, with excess of intestine and elongation of the mesentery, are entirely ignored.

At the late meeting (92) of the Southern Surgical and Gynæcological Society, Dr.

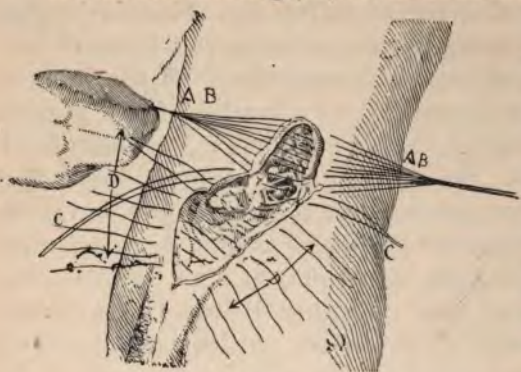


FIG. 61.

A B—Deep superficial or forcible sutures.

C—Curved or crucial sutures.

D—Sutures closing the canal and scrotal openings. The sutures to the lower border of the canal traversing the tissues. (Baxter.)

George A. Baxter presented an operation which he claimed was essentially different in principle to any yet performed. There is, however, nothing radically new about the procedure, although the free division of sound muscular tissue above the internal ring must be criticized as unwarrantable as a common practice, as is recommended by the author. The operation has yet had practically no statistical support.

DALLAS' INSTRUMENT FOR THE CURE OF HERNIA.

Dr. Alexander Dallas, of New York, claims to have devised an apparatus which will simplify the process and improve the result in the cure of hernia. By this method the patient is placed



FIG. 62.

The Dallas Instrument.

on his back, the parts cleansed and cocainized, when a transverse incision is made through the integuments and the cord exposed. Now, the instrument is introduced and pressed upward until its point has passed into and through the internal ring, into the abdomen, where the rasp-like surface of the instrument is exposed and the instrument is withdrawn. This gives rise to irritation which is supposed to aid in exudation of lymph and occlusion of the canal. Dr. Dallas tells me that it is simple and always safe, and is usually radically curative. He denies that it is a derivative

of invagination, as I regard it, and that it is wholly new in principle. This instrument may serve a useful purpose, possibly, in certain selected cases, but we can see many formidable objections in many others, and can imagine not a few in which its indiscriminate or unskilful employment might work incalculable damage on the spermatic cord or in the peritoneal cavity, and yet give no promise of radical cure.

CHAPTER XXI.

OPERATIVE TECHNIQUE IN STRANGULATED HERNIA AND ITS COMPLICATIONS, MANUAL AND INSTRUMENTAL.

The dangers attendant on strangulation chiefly arise from :

1st.—*Obstruction of the bowel.*

2d.—*Hemorrhage.*

3d.—*Inflammation and Gangrene.*

INTESTINAL OBSTRUCTION.

One of the most prominent and constant symptoms of strangulation is constipation attended with colicky pains. If strangulation is sudden, vomiting and great prostration are also present. But this is not always the case. I have known of a few cases, in which the patient has kept on his feet for one or two days after the initial colic was first noticed.

As mechanical obstruction in the vast majority of cases is extra-abdominal, bearing this clinical law in mind when such a condition is encountered, we will look to the portals of emergence for hernia. And this examination cannot be too thorough, or we

may overlook the seat of impediment, until its discovery is too late.

Two years ago I was called to see the widow of a physician, who was supposed to be suffering from enteritis. She was being diligently poulticed and treated for inflammation; but stercoraceous vomiting setting in with threatening symptoms, I was called in. My first step was to examine for hernia. None was found in the crural or inguinal regions, but as my hand reached toward the umbilical scar, it came on a strangulated exomphocele which had been overlooked. As she was now *in extremis*, operation was out of the question, and she succumbed a few hours later.

In 1885 I was attending a man who had intestinal obstruction. Nothing would open his bowels, either by the mouth or rectum. I invited Prof. Dennis to aid me. Assuming that our man had internal obstruction, he was sent to the Ninety-ninth Street Hospital to be operated on that evening. When Prof. Dennis and myself arrived, the house surgeon, Dr. Weldon, informed us that he had discovered a small femoral hernia. Our patient now was in a bad state to undergo a capital operation, and hence, immediately after kelotomy, he went into mortal collapse.

Let it be supposed that a hernia has been discovered; when symptoms of strangulation arise, clearly the course to pursue is comparatively simple, as the end to attain is to remove the obstruction.

Now, the promptness and manner in which this is best attained, will in a large measure depend on circumstances.

With women, in whose sex strangulation is less common, though terribly mortal, interference must be judicious and prompt, or else all is lost. For of all operations she seems to bear kelotomy worst, when strangulation is not relieved early.

The measures of relief for strangulation may be reduced to three.

1st.—*Rest.*

2d.—*Pressure* (taxis).

3d.—*Incision.*

REST.

One, the subject of strangulation, should be at once put to bed, and be given sufficient morphine to secure relief from pain and

relaxation of spasm ; unless there are some special indications, no topical applications are necessary.

After two or three hours when repose is secured, pressure may be commenced.

TAXIS.

Taxis is a valuable expedient in strangulation. But it is capable of doing a vast amount of damage if employed without discretion. It may be likened to the urethral bougie, which, when gently and skilfully employed, will more safely and radically cure urethral stricture than any other known means ; yet is capable in rude hands of not only destroying the passage but life as well.

So with taxis, moderate intermittent pressure will usually overcome most strangulated herniæ, and effect reduction. The application of great force, or very long continued taxis, will not only be resisted, but will subject the extruded viscera to great danger. Hence, we need tact, as much as taxis, to succeed. When a hernia resists taxis we may chill the inguinal region with cold douching or iced applications applied at short intervals.

Quite precise rules have been laid down in different text-books for the successful and safe application of taxis, in general surgery. But, practically, they have little or no application. In those directions laid down for the student and practitioner, a considerable degree of importance is attached to the manner in which the intestine is manipulated in the different phases of hernia ; *i. e.*, that the return of the hernia must be just the reverse of its descent, etc.; that the pressure must be applied in different directions in order to clear the various curves and angles, which the viscera take in the evolution of the hernia. These directions I have never found of any practical value. Indeed, when it is remembered that in the vast proportion of strangulated herniæ, the greater part of the volume consists of effused serum, and the sac, the integral parts of nearly every hernia are almost invariably adherent, and hence entirely irreducible, attention must be directed to something more than the bowel.

The cardinal points to be remembered in the application of taxis are not to employ too great force, nor make its application too protracted. If one *séance* fails, nothing will be lost by waiting

awhile, when, often, on the second or third effort, the mass will return with surprising ease. There is a singular and striking analogy between the erratic, spasmodic action of an organic urethral stricture and the spasmodic grip of a hernial constriction. At one time the stricture is wholly impassable to the finest bougie, of even a hair's diameter, while after an interval of rest, by a little coaxing, an instrument of considerable diameter may readily glide on to the bladder. And likewise with a strangulated hernia, our approach must be gentle, gradual and intermittent. Moderate, safe taxis should be unattended with pain, and hence, when manipulations are of such violence as to make our patient "cry out" with agony, we are doing harm.

The use of pulmonary anæsthetics, as an accessory means in reducing a strangulation, should be condemned as a general expedient.

It is well before taxis is commenced to empty the rectum and colon, and clear the stomach by a free emetic. These measures reduce inter-abdominal pressure, and effect, more or less, muscular relaxation.

How long can one safely permit strangulation to remain with safety to the patient?

This will depend. Though, in a general way, it may be said, when there are no very pronounced constitutional symptoms, from twenty-four to forty-eight hours is the maximum in men, and in women not more than twelve hours at the most.

If we incautiously administer morphine, its narcotic action may mask various symptoms; hence, except in the initial dose, to secure primary relief at the moment of strangulation, if given at all afterwards, it should be in very small doses.

The symptoms which portend great gravity are pronounced bodily prostration, reverse of the peristaltic wave of the intestine, with fæcal vomiting and immense ballooning of the bowel.

These symptoms should be anticipated by surgical intervention. But the medical attendant is often so hampered by divers considerations, that often the opportune moment for prompt action is past before he decides to turn the case over to the surgeon for operation. If the patient be a person of means, the physician may hesitate, fearing that the presence of the surgeon

may imply a want of skill on his part, or that he may lose the family through it. With the poor, their deep-rooted horror of all hospitals prevents them from yielding until the last moment, at a time when their lives are greatly endangered by transportation itself.

In our times, when kelotomy of itself is comparatively a safe procedure, and by combining radical measures with those for relief of strangulation, in a general way it may be laid down almost as an axiom *that in all cases in which taxis fails, or serious symptoms threaten, twelve hours is the maximum time to wait, when immediate operation should be advised.*

Every practitioner should be competent to perform a kelotomy for strangulation.

By this it is not to be supposed that all should be equally proficient, but that all, in an emergency, should be capable of immediately relieving constriction and releasing the bowel.

PREPARATIONS AND DETAILS IN OPERATIONS FOR STRANGULATED HERNIA.

The technique of operations for strangulation have, during the past fifty years, been enormously simplified and revolutionized.

The change dawned on the profession with the discovery of anæsthesia, the tolerance of the peritoneum, the introduction of asepsis, and the crowning achievement of all cocaine analgesia.

There are but few things necessary in operation for strangulation. They are: 1st. Good light. (At night I prefer candle light to any other.) 2d. Plenty of pure water. 3d. A warm, clean room. 4th. Assistants, medical, if possible; one at least, if not one or two intelligent, *cool-headed* women.

Our operative arsenal is simple. A good table, towels, sponges with dressings. For instruments we need but a scalpel, a long-curved scissors, artery clamps (two or three), suture material, needles, retractors and needle-holder.

We have mentally calculated on contingencies and are prepared to meet them.

Now we are ready for our patient. The operative areas have been properly prepared, and we have complied in every detail, as far as possible, with what modern surgery demands in the way of

aseptic precautions in their broadest sense, and we are ready to commence our journey to the hernial envelope or the cavity of the peritoneum. The objective point, let it be remembered, is the constriction at the neck. All is lost if this is overlooked. Now, with amateur operators, who cut in an emergency, I would advise them to adopt somewhat different tactics to those who are commonly accustomed to perform capital operations.

It will be noted in this monograph that very much has been said on the subject of the *sac*, and that in all the older treatises on the operative surgery of hernia it occupies an important position. Yet, notwithstanding all this, I would recommend the general practitioner not to worry himself in the least about it in strangulation cases. If the sac were a free, isolated pouch—the impression which usually prevails—if its presence were constant, or if strangulation always occurred within it, then, indeed, a familiar knowledge of its anatomical structure would be of prime importance. But as a free sac it has no place in the hernial anatomy of the body; it is almost never free from adhesions; it is not always present in strangulation, and it is yet a disputed question whether the point of strangulation is *within* it or not.

The first step then after a free incision is made, carrying this from the internal ring downward from four to six inches, is to divide and gently separate the parts, layer after layer, as one would open the coats of an onion, until he comes down on the imprisoned viscera.

All hemorrhage being staunched, the index finger of the left hand is introduced over the nude viscera, which are gently pressed and everything divided over it, until its tip is arrested at the point of strangulation. Now, at this stage, the older operators would introduce a grooved director and split the annular constriction with a probe-pointed hernia knife, having due regard in the meantime in inguinal hernia for the internal epigastric artery, which latter vessel they seem to have had a morbid fear of dividing.

For convenience in operating and safety I have for some time, discarded the probe, scalpel and grooved director, and instead of making one incision with a blade, I employ a scissors and notch the constriction in different directions; in other words,

when the precise seat of strangulation is reached and amply exposed, I take up a common dressing forceps, and seizing the free edge of the strictured ring, draw it downward and nick it with the point of a blunt-pointed scissors, in one or more places, until I am assured that resistance is amply overcome. To assure myself of this, I again re-introduce the tip of my finger and make traction in the direction of the stellated gaps in the rings, when I withdraw it and attempt reduction. If the bowel refuses to return I make a few more nicks with the scissors and again dilate the ring, when all succeeds and the hernia is reduced.

This multiple nicking of the ring is a great advantage over a single clean deep cut, for by it one is enabled to avoid opening the deep epigastric artery. Cut in what direction we may, the ring is not weakened to that extent it is when its fibers are severed completely through, with one gash through its fibers. When the free border is well drawn down with the forceps, as we close the cutting edges of the scissors, the entire operative field is under the eye, and should hemorrhage occur, it can be subdued in an instant by the same measures which we would employ should it occur elsewhere.

After the intestine is reduced, the finger should be passed into the peritoneal cavity, and all adhesions in every direction freely liberated.

It is of vital importance, before the wound is closed, to be positive that liberation has been ample and complete, or else the symptoms will persist, and our patient is lost.

Now that the hernia is reduced, a drainage tube is fixed in the lower angle of the wound, and the parts sewed up *en masse* with a continuous suture. When the case goes well, as it should, after the second day the drainage tube is removed and another dressing applied. This will be the last, and should remain in for a week or ten days.

This operation is one of emergency, which is recommended when the object in view is relief of strangulation.

It is recommended for its safety and simplicity in every phase of strangulation wherever situated. Certainly, it is not a complete measure in any sense, and would not fulfil the requirements of advanced surgery as a measure of perfection, but it is recom-

mended only in imperative cases and with the inexperienced. After recovery a truss must be worn, or the hernia may return. But this may happen after any of our operations which have been praised the loudest.

COMPLICATIONS IN STRANGULATED HERNIA.

If a large extruded mass in the inguinal region becomes strangulated in incision, we may come into a double inguinal (plate No. 63), of which but one has become strangulated. In this instance the condition of the overlying, investing, tunics will indicate in which the obstruction is lodged. In old, incarcerated hernia, undergoing strangulation, we must be prepared to deal with possible adhesions between the viscera and their investing pouch (the sac), and in this species of femoral hernia find the omentum firmly adherent to the femoral vein.

Such a case was sent into my service at the hospital, in June, 1891. The physician sending her in, supposed that she had an internal strangulation, and I was sent for to perform a laparotomy to relieve it.

In examination I found that she had a large mass, over the right saphenous opening, which she assured me she had from childhood, and which our house surgeon, Dr. Hammond, from its outline and consistence, assumed was an enlargement of the lymphatic glands.

My examination, however, convinced me that it was a hernia. At any rate, as she was in a collapsed state, a laparotomy was quite out of the question. Cutting down under cocaine, we came on to a mass of omentum, which had no sac, but was so intimately adherent to the saphenous vein that its isolation necessitated



FIG. 63.

Direct and Indirect Inguinal. (Maglisc.)

rupture of this vessel. This, however, was easily sutured, and after liberating a small knuckle of intestine, nipped in the septum crurale the parts were closed in, when she made a good recovery.

The most formidable complication in all operations for strangulation, is gangrene of the bowel.

In many cases of strangulation in which we operate we will come on to a suspicious intestine. Its wall has a dark, chocolate hue, and it has parted with its pearly, glossy surface. It is wanting in that soft, resilient feel, of the normal intestine.

In the presence of such a condition the safest course to pursue is to return the bowel to the cavity of the abdomen, at once fix it in the wound, make an artificial anus, do an enterotomy, or enterectomy.

Sir Astley Cooper advised that when we came to an intestine, the vitality of which was in question, the best place for it was in the cavity of the peritoneum. This was the generally accepted course, until Professor Nicholas Senn, in 1887, at the International Medical Congress, produced his great work on experimental intestinal surgery on the dog, and recommended a revival of intestinal anastomosis in man for conditions causing obstruction of the intestine lumen.

Since that time many operations have been performed for gangrenous intestine in strangulation.

Those operations have been immediate and consecutive; *i. e.*, some have resected the bowel at the time of hernial operation, while others have made an artificial anus, and waited until the patient had survived the shock of the primary operation before attempting resection of the intestine and reconstruction of its lumen.

It was hoped that with the new devices for rapid anastomosis that resection of the suspected part would be a simple and rapid procedure, so that we might always assume that nothing except the healthy intestine would be replaced. However seductive and promising the theory of intestinal anastomosis was, practice has abundantly demonstrated that it is one of the most formidable procedures known to surgical art, when applied in strangulation cases. Indeed, there are almost insurmountable impediments in the way of its performance; and, in fact, in those cases in which a

burst, necrotic intestine has been found and an immediate anastomosis has been performed, there are but few cases on record which have survived. When local changes have so far advanced as to induce complete gangrene of the constricted intestine, great constitutional depression is always present, which few rally from after the shock of a capital operation.

Unless the bowel has given way and faecal extravasation is present, the operation of primary resection of the intestine is an unwarranted procedure, in but very rare cases.

I have many times returned the strangulated intestine when, at the point of constriction, the pressure had cut a ring through the serous coat, and the constricted coil presented a most unpromising aspect; yet in none has extravasation followed, and most of them recovered. I am acquainted with no recorded case of recovery, in which a primary resection and enteroraphy have been performed *after* gangrenous perforation had occurred in the strangulated intestine, within the abdomen.

At the late meeting of the American Medical Association (Detroit, May, 1892), Dr. J. Rausahoff, of Chicago, presented one of the fullest and most valuable contributions on this subject (*Treatment of Gangrenous Hernia*), from which I will give such parts as are pertinent to this part of our subject. He reported having performed 27 operations for strangulation, of which 4 were gangrenous, 3 enteroceles, and one epiplocele. It does not appear that any of them had ruptured at time of operation, but all were *suspected*. He reported 170 operations for strangulation, in which real or suspected gangrene was present in 25. From various operators in the past twenty years 486 cases of strangulation, 14 per cent. were gangrenous or suspected.

Dr. Rausahoff reported his own four in detail.

His first case omental. Gangrenous part ligated and cut off. Result: death in twenty-four hours.

Second case: Was restrained from operating because he was afraid the patient would not safely survive shock, and because he was ignorant of the precise pathological state in the sac. Gangrenous perforation discovered only after death.

Third case. A gangrenous patch was discovered in the wall of the intestine. Intestine was reduced, but the suspected part was fixed against the incision in such a manner that should perforation occur, the faeces could make their way outward, unhindered. Perforation occurred, though after a time the opening spontaneously closed.

Fourth patient, a woman of 56. Here he resected fourteen inches of the suspected intestine, bringing the ends into immediate contact. Patient recovering; alive and well nineteen months after. It seems that Raushdor was the first to resect the gangrenous intestine successfully, in 1727. Poulsen has reported twenty-seven cases with four recoveries. Of thirty-five so treated in St. Bartholomew's, but four were saved. (*Brit. Med. Journal*, June, 1841.)

In England, Baker, McCormick, Banks and Treves oppose immediate resection of the gangrenous intestine.

In America, McCosh, Richardson and Dawbarn each reported a successful case. The Germans are divided in opinion on the subject of immediate resection, while the French generally oppose it.

The question then lies between one of three things, when we cut down on an intestine suspected of gangrene, as to what shall be done.

1st.—Shall it be immediately returned?

2d.—Shall it be fixed in the wound and an artificial anus established?

3d.—Shall it be resected, sutured and returned?

It must be remembered that the *suspected* intestine alone, is being now considered.

My experience would incline me to recommend the first always as a routine practice, particularly with those unaccustomed to performing capital operations, or those who cannot command every possible facility to favor a successful effort, and that means a great deal.

My next choice would be the second. For by it we are given time to prepare and observe how our patient rallies from the first operation.

The third should be regarded as an extreme and last resource. Truth, candor and personal experience compel me to regard the

resection of the intestine for gangrene as one of the most desperate undertakings in surgery. In the hands of the most skilled and adapt it is a most trying ordeal, and when it succeeds such unpleasant sequelæ may occur as to destroy the permanency of cure.

Perhaps if the "anastomatic button" of Dr. J. B. Murphy, of Chicago, which promises to reduce these operations for intestinal continuity to a few moments, will accomplish what is promised for it, resection may become an established procedure in gangrenous hernia. Perhaps I cannot do better in closing this part of the subject than quote further from Dr. Rausahoff, who, by the way, is an advocate of primary resection, who says: "When delay has brought the patient to the verge of collapse, and when shock from prolonged anæsthetics cannot be ventured, that must be done which most readily gives relief to strangulation; for whatever be the procedure adopted in the condition indicated, the result will probably be the same: death within a few hours or days."

With these sentiments I am in hearty accord. My own experience with, not *suspicious* cases, but positive gangrenous perforation, and one for resection of a *suspect*, is limited to four. The first was a woman in profound collapse, so that but little ether could be given. Coming on the sac, the intestine was found broken down by necrosis and fluid feces, with gas welling up through the incision, and in a moment she was dead on the table.

The second was in a young man, in whom the bowel was ruptured, after it had been down two days by the medical attendant in forcible taxis.

When I cut down on the sac it was found full of blood and feces, the bowel having slipped up into the peritoneal cavity, carrying the incision up through both rings, the abdomen was found full of leaking feces. Our man survived scarcely an hour after the mortified intestine was found and fixed in the wound.

Third case, another young man, in whom a strangulation was actively poulticed for an abscess before he was sent into hospital. When I saw him he had pronounced septicæmia from fecal absorption. Under cocaine the tissues were opened, when it was found that the bowels had burst, the feces making their way through the sac into the subcutaneous tissues. It was hoped that as the artificial anus would permit a free vent to the pent-up feces, he

might overcome the toxæmia, but we were disappointed, and he died on the seventh day.

Fourth case. This patient was a middle-aged man, who had strangulation but ten hours. He entered the hospital in the middle of the afternoon. When I was notified of the case, not feeling well that day, I sent word to the house surgeon to do the operation for strangulation. Three hours later, feeling a little uneasy about the case, I telephoned, inquiring how the patient had survived the operation, etc., when I was rather confounded to hear that the operation was not then completed. I now left for the hospital myself, reaching there about a half an hour later, and when I entered the operating room the scene presenting was enough to startle and confound the stoutest. Our young internel by recent reading the current medical literature, was imbued with a notion that modern experimentation had so simplified intestinal surgery that it needed no apprenticeship or special practice to succeed with it, had cut away nearly three feet of this man's bowel. Indeed, there was nearly a wash-basin of viscera, steaming fresh in a vessel, when I entered. But now the trouble came, the proximal divided end was so close to the fixed cæcum that he had found it quite impossible to dam back the fæces, or bring the separated edges together. Blood and fæces issued promiscuously from every direction, so that our young operator was at his wit's ends, and badly rattled when this stage of the operation was reached.

It was clearly apparent that if the blood torrent was not promptly arrested death must quickly end the scene. Hence, without any thought of antiseptics, after quickly washing my hands, I pulled the bleeding mesentery into the wound and clamped off the vessels. Thus, by carrying the incision further up, I was enabled to restore the continuity of the wound and complete the operation.

Our patient survived three days, sinking finally from secondary shock.

The suspected intestine which was cut away, except for one or two small patches of necrosis, which occupied only the peritoneal coat of the outer wall, was sound and everywhere intact.

Indeed, for one to undertake an enterorrhaphy on a gangrenous hernia, without ample experimentation on the lower animal, and

a thorough, practical knowledge of the physiological anatomy of the intestine, its relation and appendages, is little short of criminality.

POST-OPERATIVE TREATMENT IN STRANGULATED HERNIA WHEN
TREATED ON THE LINES HERETOFORE INDICATED IN EMERGENCY
CASES.

It will be noted that the simple rudimentary technique, so far described for strangulation, is intended only for the purpose of relieving the constriction and averting immediate danger to life. However, for all practical purposes, particularly in old people or those following sedentary pursuits, it is quite complete enough, unless there are complicating elements present, providing that thereafter a truss is constantly worn. But in our times an experienced operator is presumed to do something more than divide the constriction. In fact, in all ordinary cases, he is expected always to combine measures for radical cure with relief of strangulation. As the technique of these are essentially the same in strangulated and the non-strangulated, they will be considered in the following chapter.

Immediately after operation for strangulation the patient should be returned to a warm bed.

If the operation has been performed at the right stage, and liberation of the intestine has been complete, there should be no severe pain. On the contrary, a great sense of relief should be experienced. Vomiting should wholly cease, tympanitis subside, and bodily strength return. The patient should be given nothing but a bland, fluid diet during the first forty-eight hours. The less, the better. On the second day, if a drainage tube has been employed, it should be removed, when other final, permanent dressing should be applied, not to be disturbed for ten days or two weeks, when union should be entire. I think it is well, in all cases, to keep the patient in bed for four weeks, in order to permit of entire consolidation of the deeper layers before permitting the weight of the superincumbent viscera being thrown on them when the upright attitude is again assumed.

Unless there is some special reason, laxatives should not be given after operation. At this time it is important to give nature

repose, rest. The bruised, traumatized bowel needs undisturbed quiet, and when the proper time comes, will empty itself without being whipped into action, as it were, prematurely by irritants. On the contrary, in those *suspicious* cases, properly so called, opium should be given freely, until we are quite certain that the suspicious plagues in the serosa of the intestine have taken on adhesive inflammation, and the danger of leakage on the re-establishment of peristalsis is past.

In any case of strangulation in which there has been a persistence of grave symptoms, which indicate a continuance of obstruction after operation, it must be assumed either that our patient has developed general peritonitis, or else that the operation was incompletely performed, and a mechanical stenosis yet remains. The following is an illustrative case:

During the past month of October ('92) I was sent for to perform a kelotomy for strangulation in a young man. It was mid-day when the message came and I was not at home.

The physician in attendance, a gentleman of superior acquirements and considerable experience, believing that it would be unsafe to delay the operation until my return in the evening, invited in a neighboring practitioner, and with his assistance performed an operation. This was on Friday.

At noon, the following Sunday, another message came for me to see the case, when a condition was discovered fully detailed in a preceding chapter. The case is re-introduced here for its pertinency, as illustrating how a life may be lost in those operations when incompletely performed; as in this case must have been the result, had the unopened sac and undivided constriction not been discovered and properly treated when the patient was on the verge of the moribund state. When general peritonitis follows a kelotomy, in nine cases out of ten it must be charged to perforation. When it does occur, that paretic state of the intestine which is an integral part of the malady is apt to delude the unwary into regarding it as a mechanical obstruction, and instituting a line of surgical interference both mischievous and dangerous for its relief.

But, should it appear with the continuance of grave symptoms, that an impediment to the intestinal contents remained, then we must at once seek out the point of obstruction, re-entering

the cavity of the peritoneum by reopening the original incision. Sometimes when the intestinal coils have been reduced *en masse*, there may have been a matting or webbing of their walls just inside the internal ring, which may be easily detached with the finger with in the cavity of the peritoneum. These consecutive operations should be painless and bloodless, and performed with all possible haste. Hence, for this secondary measure, as for all hernial operations of every description, one should make in its largest possible measure *ample and thorough preparation*. Preparation of *himself, his instruments, dressings and his patient, before the first step* of operative manual is commenced.

COMPLICATIONS IN STRANGULATED HERNIA.

It is well to remember that a hernial sac may contain any of the floating viscera, and that in extruded omentum, in epiploceles, neoplastic changes may occur in its adipose or glandular elements, when we will encounter lipomata, or sarcomatous tumors.

Some time ago (two years) I gave my house-surgeon permission to operate on the next case of strangulation which came into my service. Soon after, a young Italian was admitted. When notified of his entrance, the house-surgeon was directed to proceed with the operation. Inquiring by telephone, in the evening, how the operation succeeded, I was informed that, when the second stage of the operation was reached, such a complex condition of things was discovered that it was considered best not to advance further with the operation, but to close in the primary incision and wait until I came up.

The house-surgeon further added that since the man came out of ether, the vomiting had ceased and he was feeling very much better. The following day, when I saw him, his colicky pains had disappeared and his general condition was good. Reopening the incision of the day before, I came down on a large, sarcomatous mass which enormously distended the scrotum, though it had not penetrated the tunica vaginalis, nor involved the spermatic cord. Following up its pedicle, it was seen to be continuous with a fringe of the omentum extending into the peritoneal cavity. This was ligated high up and cut off, when the large pyramidal mass was rolled out of its bed in the inguinal

tissues. On microscopical examination it was found to consist mainly of multi-nucleated giant cells. The wound healed promptly.

Dr. W. H. Link, of Petersburg, Indiana, has called my attention to the sparcity of hernia in many fat men. I am not prepared to say that males with a large "*corporation*" are less prone to hernia than their leaner brethren, but in my experience with women the fat are more liable to the infirmity than others of their sex. However, fatty tumors are not uncommon in men of every build. And not unfrequently, when a person is the subject of one in the inguinal region, and is suddenly taken with renal, gastric, or hepatic colic, if the medical attendant is not circumspect and guarded, he may imagine that his patient has a strangulated, incarcerated hernia, and hasten to do an operation for a condition which does not exist. Such a case was sent into the Harlem Hospital for operation in 1888.

After the house-surgeon, Dr. E. A. Williamson, had given the patient a small hypodermic injection of morphine, all the symptoms of strangulation vanished, though the hernial tumor and the overlying cellular tissues, which had been rather roughly handled, in forcible taxis, had not reduced in volume.

The mass was very hard and well calculated to deceive the inexperienced. The clinical history convinced me that it was not a hernia.

Cutting down on it, it was found to be a benign fibro-lipoma, which had developed in the loose cellular tissues along the cord,

CHAPTER XXI.

OPERATIVE TECHNIQUE FOR INCARCERATED, NON-STRANGULATED, REDUCIBLE HERNIA WHEN TREATED BY OPEN INCISION.

At the outset of this important part of our subject, it cannot be too plainly stated, that no special operation will answer in every variety of any one given type of hernia, wherever situated. Hence, in almost every case our technique must be so adapted as to meet special requirements.

In all operations for inguinal hernia, we should carry our incision through sound structures only to such an extent as special indications require. This is of cardinal importance to observe. It is certainly to be hoped that no one can so far deceive himself as to believe that a united fractured bone, a divided tendon or muscle, ever possesses the same flexibility and strength as in their normal, unbroken continuity. For scar tissue, nature's solder or cement substance, a derivative of connective tissue bears little or no analogy in tensile power or elasticity with normal structures.

Another reason why we should cut as sparingly as possible through tissues in continuity is because, as a rule, the wider the

breach when the open incision is made, the more unmanageable is the hernia in the event of relapse.

MANIPULATION OF THE SAC.

Before the special disposition of the sac is discussed, it may be well to have a clear understanding as to what we wish to express when we speak of this adventitious pouch. Hence we inquire: What is the sac?

Judging from the various diagrammatic illustrations of different operations and descriptions of different surgeons, we must conclude that all have not quite agreed on what constitutes a hernial *sac*. One would suppose, from the average description of this structure, that it is usually a mere pouch-like bag of serous membrane, which slips up and down through the inguinal canal, and which, every time we reduce a hernia, it, with the viscera, returns to the cavity of the peritoneum.

All this, however, is very far from the truth. The sac is something more than a serous membrane, for its fascia propria, sometimes called the fascia Cooperi, is a dense fibrous substance, separated from the serous by a cellular membrane, but always intimately adherent to it.

The serous investment of the viscera, except in recent cases of strangulation of primary hernia, is always more or less adherent to the circumjacent tissues, the tunica vaginalis, and the tubular elements of the cord. Hence, in the vast majority of cases of inguinal hernia, it is absurd to speak of reducing a sac, which is everywhere adherent, which can in no way possibly be isolated and reduced without a free open wound and a tedious dissection. The elements of the cords are often imbedded and quite intimately incorporated between the different layers of the sac. Hence, unless its investments are peeled off with most delicate attention, the cord must suffer serious damage. When this is properly accomplished, the serosa must be exposed by a linear incision running parallel with the long axis of the tumor, and be stripped by a process of decortication, which gives us, not one, but *two sacs*; one, the large, fibrous pouch from which the serous investment has been raised, and one, the serosa, or true sac.

Now, should the sac *en masse*, without this dissection, be

isolated or cut off, the neural and vascular supply of the testis cannot escape serious injury.

When an operation is performed in which only the serosa is preserved, free and deligated above, the thick, fibrous investment of the sac, an integral part of it remains in the incision. Should this fibrous—the outer tunic of the sac—layer be cautiously separated from the cord, it can be cut away or it can be reeled up and fixed anywhere along the canal, as a tampon. If a hernia can be permanently reduced, there would seem no good reason for its further retention, as it should have no further purpose to serve. Unfortunately, operators have not been clear, in all cases, in detailing the precise toilet of this infundibular process of the fascia transversalis. But those who oppose resection of the sac, base their objections in clear and unmistakable terms. First, because of the danger to the ultimate nutrition of the testis in isolating the serosa from the separated strands of the spermatic cord; and, second, because, when it is retained in the event of relapse, this dense tissue serves once more as a protecting and limiting envelope to the descending viscera.

Let not the new beginner perplex himself in searching for parts which often do not exist—those independent investments of the anatomists. In some he will search in vain for the spermatic fascia, when time, degenerative, and atrophic changes have assimilated all into one homogeneous, dense, inseparable wall of tissue.

In ancient, very large, old scrotoceles the investments of a direct and an indirect inguinal are quite indistinguishable; as all the ordinary landmarks are lost and pathological degeneration has wrought such changes that the remnants of normal structures have so altered as to be quite beyond recognition.

Nevertheless in order to perform an open operation with a high cervixectomy, the serous envelope must, if possible, be freely isolated. If not entire, then as completely as possible.

In reducible hernia it is always important if possible, to operate while the viscera occupy the sac, for they steady it, and enable us all the more readily to proceed with the work of decortication.

The importance of detecting the *serous* sac in all inguinal hernia, has been dwelt on at considerable length here, because its

recognition and proper manipulation is practically the keystone to the arch in *all* hernial operations in which it exists.

It should not be forgotten that we may find two serous sacs in an operation, or none at all. In the first, when the intestine pushes down before it an investment of omentum, this is seen. In the congenital hernia of anatomists the viscera tumble directly into the tunica vaginalis, side by side with the testis, when, of course, no independent sac is present.

As there is no important tubular structure in the female inguinal canal (the canal of Nuck), the operation and isolation of the serous investment of their herniæ is not attended with the difficulty or danger which we encounter in the male.

But, in the inguinal hernia with a woman, as all her generative system is internal, a prolapse of any or many appendages of it, often make their way into an inguinal hernial sac. Thus, in a young lady sent to me, for the treatment of a small, but very painful inguinal hernia, when the sac was opened an adherent ovary came into view, and was excised after its artery and the pedicle were ligated. Up to this time her life had been one of

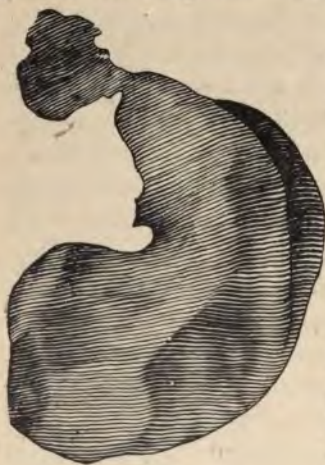


FIG. 64.
Excised Uterus in a Strangulated
Hernia.—Dr. Barber's case.

misery and pain from wearing a truss. Always during her menstrual epochs, the protrusion became swollen and exquisitely sensitive, giving her great distress, until menstruation ceased. A most remarkable case is recorded in the "American Journal of Gynecology," June, 1892, by Dr. D. P. Barber, of Saginaw, Mich. The patient was a woman, 46 years old, who consulted the doctor one year before, for a protrusion in the left inguinal region, which was growing larger and more painful, so that a truss which she had worn for years before had to be cast aside. As she complained of vague, indefinite pains in the uterine and

ovarian regions, the doctor made a vaginal examination, but could find no uterus. She was a married woman, though had been

barren; menstruating, however, with great regularity. An operation for cure of her hernia having been decided on, when the mass was exposed, it was supposed to be a new growth; hence, ligating it high up it was cut off, when it was found to consist of a portion of the left broad ligament, an ovary and the uterus. The patient made a good recovery, and was entirely relieved of her former distress.

Boyer (Tome IV, Chirurg. Malad.) cites several remarkable and extraordinary cases of the escape of the viscera in males. He had seen himself four in which the bladder had escaped through the inguinal apertures in males, in which it had been cut on and opened, under the supposition that it was the sac.

In one case of a young artillery officer he performed a lithotomy, and removed a stone through the inguinal incision from the extruded bladder weighing three ounces; and cites several similar cases in the practice of others. The most marvelous of all which he records was the case of a lady of rank, who conceived after marriage in a herniated uterus. As time went on the hernia increased in volume until, as the time for her accouchment approached, the enormous hernia, now with its great weight and mammoth proportion, totally disabled her from exercise. At term a living infant was delivered through the divided hernial walls, but, as a great quantity of blood was lost and inflammation followed, the mother sank on the third day after delivery.

MANIPULATION OF THE CONTENTS OF THE SAC WHEN THIS IS PRESENT.

Having opened the sac and liberated the adhesions to it from the contained viscera, if such exist when the intestine protrude, there is but one course to pursue, which is to return it into the peritoneal cavity. Should, however, the hernial contents be omental, then there are two or three different courses open to us.

The first is to reduce this as the bowel within the ring.

The second is to draw it and the slack in the canal well down, ligate it after multiple transfixion, cut it off after the plan of Championnière, and permit it to return.

The third is to fix its pedicle in the canal or ring as a tampon, and close the integuments over it.

The first is the simplest course, and the most secure from immediate danger or ultimate unpleasant psychical phenomena.

By this procedure the danger of hemorrhage from the stump is obviated, as are also the chances of septic infection diminished. But it is not to be practiced, for the reason that it is one of the original ætiological factors of the infirmity. It lies just inside the ring after reduction, only waiting for another favorable opportunity to re-descend. The second, when carried out with extreme attention to detail, is the most rational and successful. But very great care must be exercised in ligating the neck to securely close all the vessels in the omentum. If the vessels can be isolated and separately ligated without including the nerves, it would be the ideal procedure in hernial treatment of epiphocetes. For by it two important, fundamental, ætiological factors of the infirmity would be removed. First, it reduces by excision of the omentum intra-abdominal pressure; and, secondly, with its complete excision, the visceral element in causation has been permanently eliminated.

The third, omental tamponage, entails excision of redundant omentum, while its pedicle is imbedded in the canal or ring. This procedure I have once utilized to advantage in a case, and many other similar, scattered cases are recorded in the modern literature of hernia, a recapitulation of which would serve no useful purpose at the present.

RADICAL CURE OF FEMORAL HERNIA.

The technique in operations for strangulation and radical cure in femoral hernia is essentially the same as for inguinal, except that while it is possible to wholly obliterate the inguinal canal, as when castration is practiced, this is quite impossible with the crural canal or saphenous opening through which the femoral vessels pass to and from the lower extremity.

It is a matter of common observation with femoral hernia that, as a general rule, it is more incoercible to the truss than inguinal. It is also well known that it is a hernia in which relapse is almost invariable, regardless of how treated by radical measures.

In operations for radical cure in this situation, Gerdy's primitive invagination and all its derivatives are entirely inapplicable.

The operation which should give the greatest success as a radical measure in enteroceles is the tamponage of the canal with the folded sac. The sac here can be rapidly and completely isolated, though when imbedded in the canal it may give rise to ulceration and slough away, as it does sometimes in McEwen's operation for inguinal hernia, yet its results, from a theoretical standpoint at least, should give the best results. My own experience in femoral hernia, in which I have attempted radical cure with relief of strangulation, is limited to four cases. One died. Two on whom I operated for strangulated femoral enteroceles had relapses within six months. In one, the last who had an epiplocele, the cure was complete and permanent after two years. In all femoral epiploceles, when we are assured of their real anatomical character, and they are painful and uncontrollable, a radical operation may at times effect a permanent cure.

TECHNIQUE IN OPERATIONS FOR RADICAL CURE OF FEMORAL HERNIA.

A large, free incision is necessary in operations for radical cure, or strangulation in femoral hernia. In the majority of cases we will find that the sac has formed intimate adhesion, when it is present with the femoral vein and the septum crurale. In women, and in fat men, we will find the constriction in strangulation at a great depth from the surface, and in cases in which radical cure is attempted, owing to the extreme obliquity and depth of the canal, the neck of the sac is manipulated and deep sutures are inserted with considerable difficulty.

In all cases of large femoral hernia it is a good practice to close the upper free borders of the falciform process with the fascia lata, and in this manner reduce and narrow the diameters of the widely gaping saphenous opening, thereby in a certain measure constructing a barrier against future relapse. In all cases of operations for this phase of the infirmity, the truss should be immediately applied on leaving the bed, and worn at least for six months.

This operation in femoral hernia is adopted in the majority of cases, rather for the purpose of rendering a painful, unmanageable hernia comfortable and coercible than to expect an "out and out" permanent cure. The former usually succeeds, while the

latter with this type of visceral protrusion has not yet been realized in but few exceptional cases.

RADICAL OPERATIONS FOR UMBILICAL, VENTRAL, AND LAPAROTOMY
HERNIA.

Pathological hernia are common in the walls of women's abdomens, though they seldom occasion much inconvenience or danger to life. But they may become strangulated, or they may, as we have seen, burst and bleed, or ulcerate. Besides, they may occasion so much inconvenience, in rare cases, as to render one's life miserable, and require something more than palliative measures to control them.

In the adult, umbilical, or ventral hernia, truss pressure is not efficient. But as none of these operations on the abdominal walls for hernia can promise a permanent cure, or are free from danger to life, they will be undertaken only as an extreme resort.

Our patient in these cases is prepared as for a laparotomy, which this operation practically is, and let us undertake no operations here on an old asthmatic, or bronchitis man or woman, if we would be spared the humiliation of seeing a prompt and aggravated relapse before our patient is fairly on her feet. It is a question whether it is a justifiable procedure to undertake, as one of selection, on a child-bearing woman. In a general way hernial operations for radical cure are not to be recommended on one who is likely to pass through the travail of child-bearing, for the violent, spasmodic contractions of the muscles must almost inevitably tear through cicatricial seams at the hernial portal, and reproduce a condition much worse than the original. This must be especially the case with exomphoceles.

Operations for umbilical hernia are much more difficult of performance than those which we have considered. Often there is no independent serous investment, but, the viscera, spread in different directions, and forms adhesions with everything in contact with them.

Their cutaneous investment has spread out in old cases as thin as tissue paper, and at the neck the recti muscles have so far spread out as to be perfectly brought together and retained in apposition, only with the greatest difficulty.

Our patient having been finally prepared for a capital operation, we now proceed with its different steps.

We must commence with a free linear incision, carried immediately over the convexity of the tumor. Some, having completed this incision, bisect it with another crossing this in its center in a diagonal direction. This second incision increases the area of mutilation, but it simplifies the dissection; and, as the thin integumental covering of the tumor is a redundant, useless structure, after the hernia is reduced, it is cut away, no harm is done, in any event.

As so-called "umbilical herniæ" seldom make their escape directly through the navel aperture, we will only occasionally come on to the urachus, or the round ligament of the liver. When these have, however, engaged, and been carried forward, their loose slack must be cut away; their proximal ends being fixed in the opening. After liberating the sac, returning the intestine, its neck is transfixed in one or more places, ligated and amputated.

When the mass is omental it should be cut away, and its pedicle treated with great care before being dropped into the peritoneal cavity. In one of my own cases, after excising the omentum, and returning the ligated stalk, when dropped in, one of the ligatures slipped, and, for a moment, there was an enormous gush of arterial blood from the open vessel. In a moment the peritoneal cavity was filled with blood. Passing in two fingers, after quickly feeling in every direction, I came on the retracted omentum, drew it out again, through the wound, and firmly secured it before it was too late; our patient, ultimately, making a good recovery.

The vessels in an umbilical epiplocele must be securely ligated, each of the larger separately, with fine silk, and then the thin, investing serous envelope should be drawn over the open surface and its free edges sewn solidly together. This latter step renders any further leakage improbable, besides, in a large measure, obviates the tendency to adhesions of the intestine with the free surface returned.

All are agreed that, at least in umbilical operations, we must discard all measures which interfere with primary union, hence, prompt and solid agglutination of the edges of the wound should be secured in every case.

There is some difference of opinion as to the manner in which this is most efficiently accomplished, some employing a "through and through" suture, which includes the integument and the underlying tissues with the serous membrane. Others prefer to sew the serosa with its fibrous coat in separate layers, and then close in all the overlying planes with one heavy suture.

My own preference is for the latter, as by it we are the better enabled to effect a homologous approximation of the divided structures.

There is no unanimity of opinion yet on the material to be employed for suture. Many employ the silk-worm gut, common twisted silk, or silver-wire, while not a few prefer an absorbable material, and accordingly use kangaroo or cat-gut suture.

In small non-adherent hernia in this region, it is quite immaterial as to which is employed. But when the hernia is large and the hiatus at the ring is considerable, the parts must be drawn together and held by some powerful, non-elastic suture, which will hold them in close union until healing is complete.

For this purpose it has been recommended that silk be employed in the serous layer, and heavy wire through the muscles and integument. In one of my own cases, in a large, fat woman, with an enormous exomphocele, everything went well after operation until the second day, when a most irritable, violent cough set in, when vomiting and abdominal pain commenced. On removing the dressing it was found that primary union was nearly complete, and there was no unusual fullness at the seat of operation.

It was supposed that general peritonitis had developed. After two days of great distress, which was only relieved by large doses of morphine, she sank.

On *post-mortem* examination it was found that the internal seam of sutures had completely torn through, and that a kuckle of the small intestine had slipped through the opening thus made, and had become strangulated.

The position of the umbilical opening is such as to interfere with constant and direct pressure. Besides, its close proximity to the diaphragm is so productive of such ceaseless motion, as to seriously interfere with that repose so needful in the repair of wounds.

EVENTRATIONS, LAPAROTOMY HERNIA, ETC., AND THEIR OPERATIVE TREATMENT.

Ventral hernia, following abdominal section, is a lesion of modern times. It is one of those unhappy sequelæ so commonly seen after an abdominal section performed in any part of the abdominal walls. Tait and others have thought that it might be avoided if operators cut wide of fibrous structures, and penetrated the abdominal cavity through muscular tissues. My own experience, however, is not in accord with this view, for many of the worst cases which I have met were those after operation in the appendix, in which the incision entered through muscle only.

That they are becoming of an alarming frequency may be gathered from the fact that * a single surgeon has recently reported one hundred operations, performed by himself, for this distressing affliction.

Inasmuch as it is assumed that no operator escapes them, there must at this time be an enormous number so herniated in this country.

The technique of their treatment is precisely the same as for laparotomy, but it is often greatly complicated by adhesions. When they are of very considerable size, and the degree of separation is great, unless undisturbed coaptation of the refreshed, separated edges can be maintained over a considerable period of time, a prompt relapse on taking the upright posture is almost inevitable; hence, in order to obviate this as far as possible, the deep, aponeurotic structures should be brought together, and retained with numerous silver wire sutures or strong silk, which have a deep grip in the tissues on either side. A stout, firm bandage should be applied, and the patient kept in bed, on a restricted diet, for at least two months before being permitted her full freedom again.

POST-OPERATIVE TREATMENT OF HERNIA:

When we clearly understand the groundwork of all abdominal hernia, and recognize the fact that our measures by direct surgical intervention are directed to nothing but the mural element in the ætiology, it becomes at once apparent that the temporary

* Dr. Joseph Price, *Annals of Gynecology*, p. 141, Dec., '92.

closure of the escape portal, and the retention of the bowel, cannot be depended on as a permanent condition, without a supplementary support. The elongated mesentery remains. I have seen the small intestine of a large woman measure scarcely ten feet, and the same gut in a short, thick-set man more than thirty-two feet long.

This superfluous bowel and lax mesenteric ligament, then, should be braced or trussed up, even after the hernia has been cured. For this purpose, every person who has ever been laparotomized, or who has had a hernial operation performed on him (or her), either for strangulation or radical cure, should for the remainder of life wear a broad, strong abdominal girth or belt of some firm, unyielding substance.

With those employed at manual labor this is an imperative, necessity, while, with others following sedentary occupations or living in ease or idleness, it may be in a few cases dispensed with; or fabricated of a light, elastic material and worn intermittently only.

If the belt is worn there will be little need of a truss; yet, when the tissues over the wound commence to bulge, and relapse is threatened, we must make no delay in falling back on the old truss apparatus, for under these circumstances nothing will take its place.

MENTAL ALIENATION CONSECUTIVE TO HERNIAL OPERATIONS.

With the exception of Juillard's case I can find no record of the above condition occurring in the practice of others, after hernial operations. It is a well-known sequence, after laparotomy in many cases, particularly in those wherein an opening is made, immediately over the solar-plexus, in the epigastric region.

But it has been my experience to see four well marked cases of a mild type, after hernial operations. In three the extrusion was omental. These were two men and two women. The phase of mental aberration which followed took the form of a persistent, oppressive melancholy.

One was a case of strangulation in a woman, in whom a permanent cure followed operation. The other three were operated on for radical cure on reducible hernia. In one a permanent cure following, the other two relapsing.

I have no theory to offer as to the elementary pathology of this condition, but it is rational to assume that it may be attributable to mutilation of the sympathetic ganglia, caught up in the extended omentum, or to compression of the nerve filaments of the solar system, within the ligature applied to secure the blood-vessels in the pedicle.

Despondency is a well-known clinical symptom in all abdominal visceral diseases. Now, whether this mental depression, consequent on hernial operations is directly attributable to reflex irritation, transmitted to the cerebral centers, or not, is a matter of doubt; but, that a phase of melancholia is one of the sequelæ of hernial operations, which involve the omentum, seems to me, from my own experience, an indisputable fact.

This consecutive phenomenon should be borne in mind as one of the possible unpleasant sequences of radical measures, which may follow in cases of non-strangulated hernia, when contemplating surgical interference.

TREATMENT OF HERNIA, RELAPSING AFTER OPERATION.

The general indication for treatment here is essentially similar to those in which no operation whatever has been done; *i. e.*, if they are small, painless, easily controllable, and not attended by symptoms of strangulation, they should not be interfered with, because the second operation, in many cases, affords no more immunity from recurrence than the primary, and always entails an additional mutilation of tissue.

But, when relapse has been prompt, after the first operation, and the hernia manifests a tendency to rapid growth, then another operation is a justifiable and commendable procedure. I have operated on others' failures, and, I presume, on the other hand, my cases of relapses have gone into the service of other surgeons for further treatment.

Operations for Strangulated Hernia, With and Without Combined Measures for Radical Cure.

ORDER.	YEAR.	AGE.	DATE OF OPERATION.	INFIRMITY.	OPERATION.	RESULT.
1st case.	1885.	50.	May 14th.	(Inguinal hernia.) Strangulated indirect.	Male. Open incision; division of constriction at neck of the sac, and reduction of intestine. Wound packed from the bottom. (Ether.)	As this man was in collapse at time of operation, he sank six hours after return to his bed, of shock.
2d case.	1886.	42.	December 12th.	Strangulated inguinal hernia.	Male. Open incision; excision of gangrenous omentum; with free gauze drainage. (Ether.)	Made a good recovery, and left hospital well three weeks after operation.
3d case.	1887.	31.	June 27th.	Strangulated femoral hernia.	Female. Entered hospital on third day after strangulation in state of great collapse. Operation under ether. Open incision; sac <i>in situ</i> . (Ether.)	Death from shock and pulmonary oedema eight hours after operation.
4th case.	1885.	42.	July 13th.	Strangulated direct inguinal.	Female. Free division of parts and reduction of <i>suspected</i> intestine. Open treatment. (Ether.)	Died of perforation of gut and pulmo- nary peritonitis on second day.
5th case.	1886.	27.	February 10th.	Strangulated indirect inguinal, right side. Acute strangulation.	Male. Open incision with reduction of the sac. The latter was unopened. Wound healed by granulation. (Ether.)	No mishaps; vomiting cured, and patient promptly recovered after operation.

Operations for Strangulated Hernia, With and Without Combined Measures for Radical Cure—Continued.

ORDER.	YEAR.	AGE.	DATE OF OPERATION.	INFIRMITY.	OPERATION.	RESULT.
6th case.	1887.	38.	April 12th.	Strangulated, incarcerated, left inguinal hernia.	Male. Open incision; sac divided <i>in situ</i> ; omentum enterocele firm, and extensive adhesions. (Ether.)	Death from shock ten hours after operation. (No <i>post-mortem</i> allowed.)
7th case.	1888.	41.	February 12th.	Strangulated femoral hernia of twenty-two hours' duration. Right side.	Female. Long linear incision over the convexity of the tumor. Reisel's operation for radical cure combined. (Ether.)	Patient made a good recovery, and now, after four years, hernia has not relapsed.
8th case.	1888.	32.	May 20th.	Strangulated, indirect, inguinal, incarcerated.	Male. Incision; excision of the sac and quilled suture of canal; no drainage. (Ether.)	Operation; recovery. Relapse of hernia after fifteen months.
9th case.	1888.	71.	September 2d.	Strangulated, inguinal, indirect. Twenty-four hours' duration.	Male. Usual long incision; de-cortication of sac with its torsion and division. Wound healed by granulation. (Ether.)	Operation; recovery. Relapse after six months.
10th case.	1889.	29.	June 12th.	Strangulated, inguinal, indirect. Great collapse.	Male. Free hypodermic medication, and but partly anesthetized with ether. Operation hurriedly performed for relief of strangulation only. (Ether.)	Never rallied from ether coma, and died two hours after operation.

Operations for Strangulated Hernia, With and Without Combined Measures for Radical Cure—Continued.

ORDER.	YEAR.	AGE.	DATE OF OPERATION.	INFIRMITY.	OPERATION.	RESULT.
11th case.	1889.	37.	November 12th.	Strangulated, congenital, inguinal. (Right, with ectopic testis.)	Male. Free incision; castration; obliteration of the infundibulum, and solid hermetic suturing of the ring. (Ether.)	Death from shock six hours after operation.
12th case.	1890.	42.	March 16th.	Strangulated, umbilical. Had existed since first confinement.	Female. Patient in a moribund state when seen.	
13th case.	1890.	29.	August 2d.	Strangulated, inguinal epiplocele. Right side.	Male. Free incision; decortication of the sac, with complete excision of the omentum, close to the inner ring. (Ether.)	Prompt recovery, and no relapse since.
14th case.	1891.	64.	February 15th.	Strangulated, femoral hernia. Left side.	Female. Open incision; constriction at the falciform; process divided; hernia returned; adherent sac left in the wound. (Ether.)	Death from shock on the morning of the second day.
15th case.	1891.	36.	March 12th.	Strangulated hernia, right inguinal; complicated with hydrocele.	Male. Open incision, with free decortication and ablation of the sac; and radical cure by method of McBurney. (Ether.)	Good recovery. Hernia relapse after fourteen months.

ORDER.	YEAR.	AGE.	DATE OF OPERATION.	INFIRMITY.	OPERATION.	RESULT.
16th case.	1891.	23.	June 12th.	Strangulated, femoral, incarcerated. Great collapse and depression.	Female. Operation under <i>cocaine analgesia</i> (thirty minutes' duration). Radical cure by Championnière's procedure.	Result — quite the ideal in every particular. No hernial relapse.
17th case.	1891.	52.	December 12th.	Strangulated, inguinal hernia. Right side. Patient subject to hernial disease.	Male. <i>Cocaine analgesia</i> . One assistant. Release of the constriction, combined with Ball's operation for radical cure.	Good operative result; but hernia promptly relapsed.
18th case.	1892.	46.	November 19th.	Strangulated, right inguinal. Large scrotocele.	Male. Operation by house-surgeon; resecting more than three feet of suspected intestine. (Ether.)	Death from peritonitis after forty-eight hours.
19th case.	1892.	40.	June 12th.	Cancerous infiltration of strangulated epiplocele. Right side.	Male. Primary operation limited to incision down to the sac. After relieving strangulation, McBurney's operation for radical cure was performed.	Prompt recovery from operation. Has been lost sight of.
20th case.	1892.	26.	June 17th.	Strangulation with perforation of bowels. Right inguinal.	Male. On opening the sac it was found that by violence the intestine had been burst, and returned, leaving the thin pouch filled with the intestinal contents. (Cocaine.)	As toxæmia was pronounced when operation for opening was made, he died after forty hours.

Operations for Strangulated Hernia, With and Without Combined Measures for Radical Cure—Continued.

ORDER.	YEAR.	AGE.	DATE OF OPERATION.	INFIRMITY.	OPERATION.	RESULT.
21st case.	1892.	41.	May —.	Strangulated, inguinal (left). Gangrene of intestine.	Female. Open incision into the broken-down bowel. Artificial anus. (Ether.)	Death on the table, before dressings were complete.
22d case.	1892.	26.	September 12th.	Strangulated, right inguinal. Duration two days, not very tightly gripped.	Male. This was a case in which a second operation was necessary, through the constriction of the neck being overlooked by first operator. Championnière's r. o. (Cocaine.)	Good recovery. Too short time to speak of permanency of results.
23d case.	1892.	29.	November 12th.	Strangulated, inguinal (left). Gangrene of gut, with fecal infiltration.	Male. Free incision, and drainage of fecal matter. Artificial anus. (Cocaine.)	Death from toxemia on the fourth day.
24th case.	1892.	26.	December 16th.	Strangulated, inguinal (right). Six hours' duration.	Male. Release of strangulation, with Championnière's operation for radical cure.	Excellent operative result.

Operations for Radical Cure of Non-Strangulated Hernia.

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ORDER.	YEAR.	AGE.	DATE OF OPERATION.	INFIRMITY.	OPERATION.	RESULT.
25th case.	1887.	67.	December 12th.	Indirect, incarcerated, inguinal. Right side.	Male. Reverdin's operation, with sac left <i>in situ</i> .	Satisfactory operation. Relapse after thirteen months.
26th case.	1888.	2.	March 18th.	Congenital, right inguinal. Incoercible to the truss.	Male. Decortication of the sac, and its invagination in the canal with deep cat-gut suturing.	Recovery. Relapse after two years.
27th case.	1888.	30.	June 10th.	Inguinal epiplocele, left side; incarcerated.	Male. Excision of the sac with tamponing of the internal ring with omental tissue.	Recovery. No relapse up to a month ago.
28th case.	1888.	41.	October 7th.	Small, lacerated umbilical, giving issue to free hemorrhage.	Female. Excision of cellular tissue investment. Deep, harelip pins were employed, with cat-gut for deep suturing.	Recovery. No relapse since operation.
29th case.	1889.	3 weeks.	June 10th.	Very large scrotal hernia, unmanageable to the truss.	Male. Open incision; McBurney's operation.	Recovery. Relapse after ten months.
30th case.	1889.	71.	March 10th.	Left inguinal; large and uncontrollable.	Male. McBurney's open operation.	Recovery. Relapse after six months; but now easily manageable to truss.

Operations for Radical Cure of Non-Strangulated Hernia—Continued.

ORDER.	YEAR.	AGE.	DATE OF OPERATION.	INFIRMITY.	OPERATION.	RESULT.
31st case.	1889.	27.	May 14th.	Right inguinal hernia. Painful.	Male. Championnière's operation.	Recovery. Relapse after six months; but no pain.
32d case.	1889.	46.	July 17th.	Left inguinal hernia, complicated with ectopic testis.	Male. Fixation of the testicle in the scrotum. Excision of the sac, and immediate enclosure of the parts with three layers of suture.	Recovery. There has been no relapse, though truss is constantly worn.
33d case.	1889.	14.	November 14th.	Right inguinal hernia, with encysted cord.	Male. Excision of cyst and invagination of sac, with direct deep suturing of canal.	Recovery. No relapse. Constantly wears a truss.
34th case.	1890.	9.	January 2d.	Right inguinal hernia; incarcerated.	Female. McBurney's operation.	Recovery. No relapse for two years, when he was lost sight of.
35th case.	1890.	8.	April 12th.	Small, left epiplocele; irreducible.	Reisel's operation; excision of neck, but sac left <i>in situ</i> .	Recovery. Relapse after eighteen months.
36th case.	1890.	26.	June 19th.	Large, right scrotoccele; incoercible to the truss.	Male. Sac resected, and common ring closed with buried silver wire suture.	Recovery. No relapse. Constantly wears a truss.

Operations for Radical Cure of Non-Strangulated Hernia—Continued.

ORDER.	YEAR.	AGE.	DATE OF OPERATION.	INFIRMITY.	OPERATION.	RESULT.
37th case.	1891.	43.	May 12th.	Direct, inguinal, left side; enterocele.	Male. McBurney's operation, modified by suturing the internal ring with silk.	Recovery. No relapse two years after operation.
38th case.	1891.	2.	July 7th.	Incomplete, inguinal, large. Right.	Cervicotomy. Sac left <i>in situ</i> , pillars sutured. Wound closed without drainage.	Recovery. Relapse in eight months.
39th case.	1891.	3.	September 19th.	Double inguinal	Male. Operation on one side only by Championnière's plan.	Recovery. Relapse after eighteen months.
40th case.	1891.	24.	November 9th.	Femoral (right) epiplocele.	Male. Tamponage of the femoral canal and <i>septum crurale</i> with omental tissue.	Recovery. Relapse at the end of eighteen months.
41st case.	1891.	2.	December 9th.	Umbilical hernia; irreducible.	Female. Free dissection and liberation of viscera. Refreshening and suturing ring.	Recovery. No relapse as yet.
42d case.	1891.	4.	December 27th.	Inguinal hernia. Right side.	Male. Championnière's operation.	No relapse after one year.

Operations for Radical Cure of Non-Strangulated Hernia—Continued.

ORDER.	YEAR.	AGE.	DATE OF OPERATION.	INFIRMITY.	OPERATION.	RESULT.
43d case.	1892.	1.	January 12th.	Umbilical. Small and irreducible.	Female. Ligature of neck of sac and closure of the ring with cat-gut suture.	Recovery. No recurrence January 1st, 1893.
44th case.	1892.	46.	January 19th.	Large umbilical hernia. Painful and incarcerated.	Female. Free dissection. Excision of the omentum.	Death fifty hours after operation, from shock and peritonitis.
45th case.	1892.	24.	January 27th.	Small, painful inguinal. Left side.	Male. Championnière's operation.	Recovery. Relapse after nine months.
46th case.	1892.	5.	February 2d.	Umbilical hernia, large and painful.	Female. Reduction of hernia and subcutaneous suturing of sac.	Recovery. No relapse after January 1st, 1893.
47th case.	1892.	1.	February 14th.	Large scrotal. Right side.	Male. Reduction of hernia, followed by invagination and suturing of the sac in the ring.	Recovery. Truss worn constantly since.
48h case.	1892.	27.	February 21st.	Femoral hernia. Right side. Incoercible.	Female. Excision of sac and obliteration of lumen of <i>septum crurale</i> by deep buried suture.	Recovery. Truss worn constantly. No relapse.

Operations for Radical Cure of Non-Strangulated Hernia—Continued.

ORDER.	YEAR.	AGE.	DATE OF OPERATION.	INFIRMITY.	OPERATION.	RESULT.
49th case.	1892.	51.	April 2d.	Small, painful, umbilical hernia.	Male. Open incision. No sac. Small omental mass, size of a marble, resected. Deep silk suture employed. No drainage.	Recovery. Prompt union. Wears a belt. No relapse.
50th case.	1892.	52.	April 16th.	Large scrotocoele (right), with hydrocele.	Male. First complete retention with truss for one month. Second incision in ring and pillars approximated with by silk suture.	Recovery. No relapse. Pad and belt constantly worn.
51st case.	1892.	3.	May 7th.	Small, painful umbilical.	Female. Reduction and subcutaneous suture with chromicized cat-gut.	Recovery. No relapse January 1st, 1893.
52d case.	1892.	32.	July 2d.	Incarcerated and irreducible inguinal hernia. Right side.	Male. Free incision. Body of sac closed by quilted suture. Its neck divided. Wound closed in three layers of sutures.	Recovery. No relapse after six months.
53d case.	1892.	24.	August 7th.	Small, reducible, right inguinal. (In applicant for police)	Male. Small incision over intercolumnar fascia; and injection into the perivascular elements of the cord, in inguinal canal, of twenty drops of strong alcohol.	Recovery. Successful in every particular. No relapse. Wears belt.

Operations for Radical Cure of Non-Strangulated Hernia—Continued.

ORDER.	YEAR.	AGE.	DATE OF OPERATION.	INFIRMITY.	OPERATION.	RESULT.
54th case.	1892.	34.	August 29th.	Reducible hernia; left inguinal.	Female. Resection of a prolapsed ovary in canal. No drainage.	Recovery. No relapse.
55th case.	1892.	6.	October 12th.	Incoercible, right inguinal hernia.	Resection of sac and closure of parts in four layers. No drainage.	Recovery. No relapse.
56th case.	1893.	45.	January 4th.	Incoercible, left inguinal hernia.	Exposure of sac, ligation of its neck, and quilting of the slack and solid suturing of rings.	Recovery.
57th case.	1892.	23.	November 17th.	Small, painful, femoral hernia.	Female. Championnière's operation.	Recovery. No relapse in two months.
58th case.	1892.	40.	December 2d.	Small, inguinal, painful epiplocele.	Reisel's operation.	Recovery. No relapse in one month.

RECAPITULATION AND SUMMARY OF OPERATIONS.

In the recorded list of operation one of the first things that will be noticed, is the great difference in the mortality of operations performed for strangulation, and for radical cure in the non-strangulated.

In the former, since the general substitution of cocaine analgesia for pulmonary anæsthetics, unless our patients have been moribund, or the intestine is not gangrenous at time of operation, there have been no deaths, both with those on whom I have operated in hospital and outside practice.

It will be observed, too, that the mortality in non-strangulated cases in my experience bears out Bull's statement that it is practically *nil*.

At the present time, my purpose in contemplation, when I herniotomize, is not so much to secure a radical cure as to place the hernia in such a position as it will give no inconvenience, and may be safely controlled by truss support.

I have followed out no orthodox plan in operations, but am guided here on precisely the same principles as I would in performing an amputation, viz., totally disregarding all those specially designated operations, and in each case select such an one, with or without modification, as the conditions in each case may require.

The operations which I have latterly employed in adult, non-incarcerated hernia have been instituted more as relief-measures than as radical cures *per se*. And, hence, as an invariable rule, I advise, as soon as the patient takes erect attitude, the immediate employment of the broad belt or truss. The latter always when the hernial operations are large and the hernia has been an old one.

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